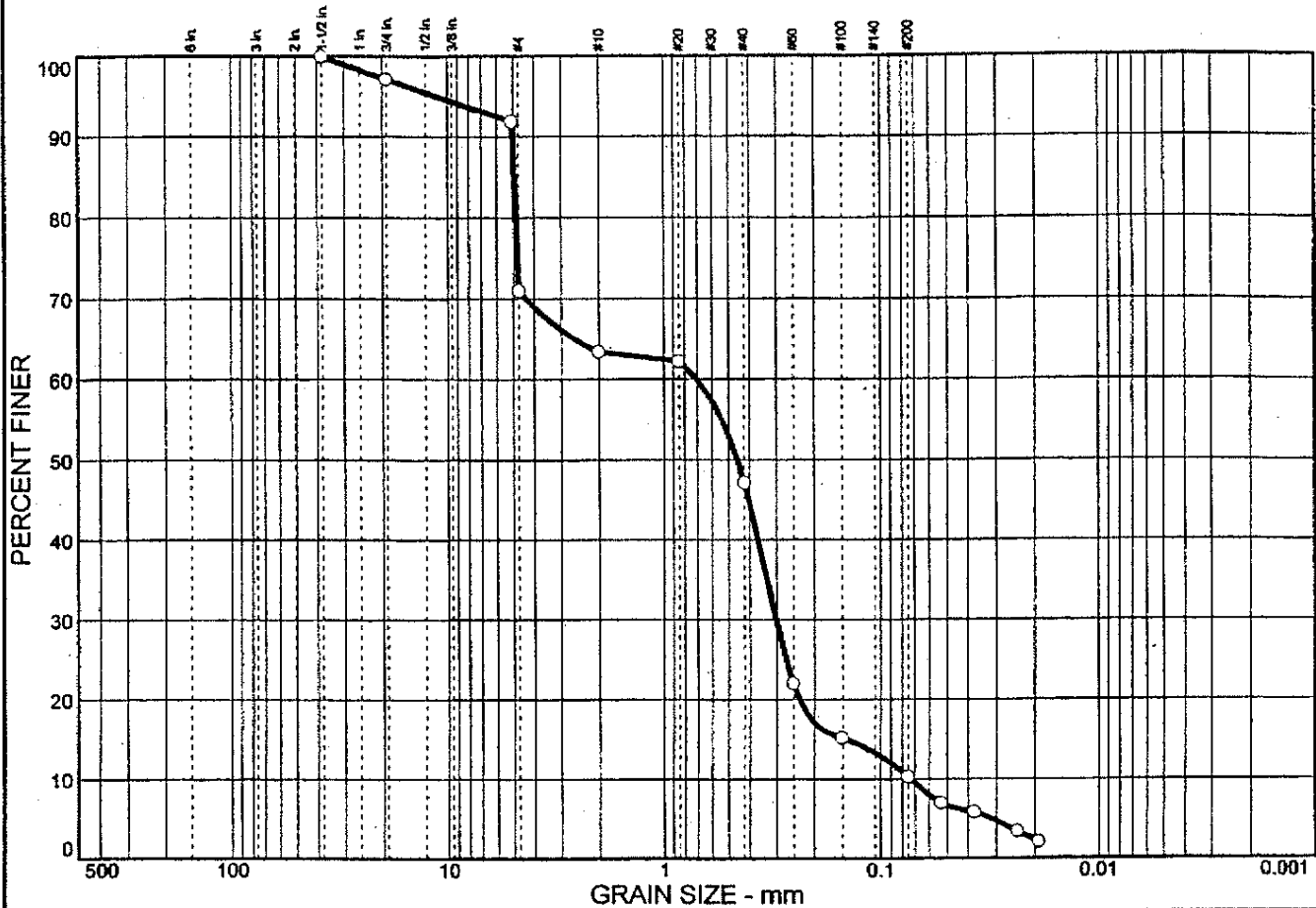


Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	29.1	60.6	10.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5 in.	100.0		
.75 in.	97.2		
.2 in.	91.9		
#4	70.9		
#10	63.4		
#20	62.2		
#40	47.1		
#60	22.0		
#100	15.2		
#200	10.3		

* (no specification provided)

Soil Description
 Well-graded sand with silt and gravel.
 2.3% finer than 0.02mm.
 Non Frost Susceptible.

Atterberg Limits
 PL= NP LL= NV PI=

Coefficients
 D₈₅= 4.97 D₆₀= 0.710 D₅₀= 0.458
 D₃₀= 0.302 D₁₅= 0.143 D₁₀= 0.0729
 C_u= 9.74 C_c= 1.76

Classification
 USCS= SW-SM AASHTO=

Remarks
 Natural Moisture 3.9%.

Sample No.: 3b
 Location:

Source of Sample: AP-14

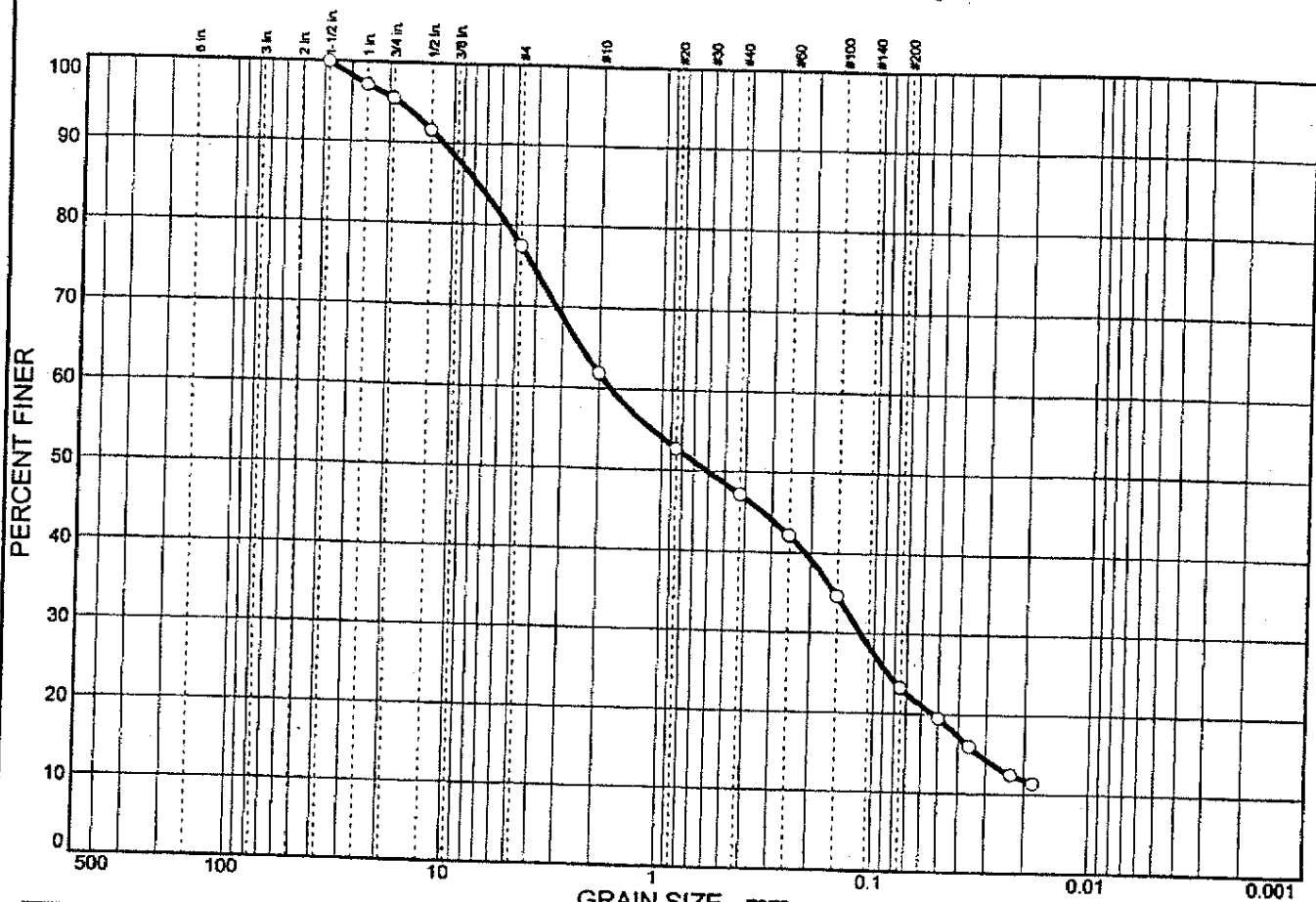
Date: 2/26/01
 Elev./Depth: 9.5-11.5

**A.W. Murfitt
 Company**

Client: U.S. Army Engineer District, Alaska
 Project: Family Housing Upgrade (FTW230)
 Fort Wainwright, Alaska
 Project No: 01-369.08

Plate 22

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	22.6	54.2	23.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5 in.	100.0		
1 in.	97.2		
.75 in.	95.5		
.5 in.	91.6		
#4	77.4		
#10	61.8		
#20	52.7		
#40	47.1		
#60	42.1		
#100	34.6		
#200	23.2		

(no specification provided)

Soil Description
 Silty sand with gravel.
 11.8% finer than 0.02mm.
 Frost Class F 2.

Atterberg Limits
 PL= NP LL= NV PI=

Coefficients
 D₈₅= 7.61 D₆₀= 1.76 D₅₀= 0.609
 D₃₀= 0.116 D₁₅= 0.0323 D₁₀=
 C_u= C_c=

Classification
 USCS= SM AASHTO=

Remarks
 Natural Moisture 22.1%.
 Portions Of Fiber Board And Glass Present In Sample.

Sample No.: 2
 Location:

Source of Sample: AP-15

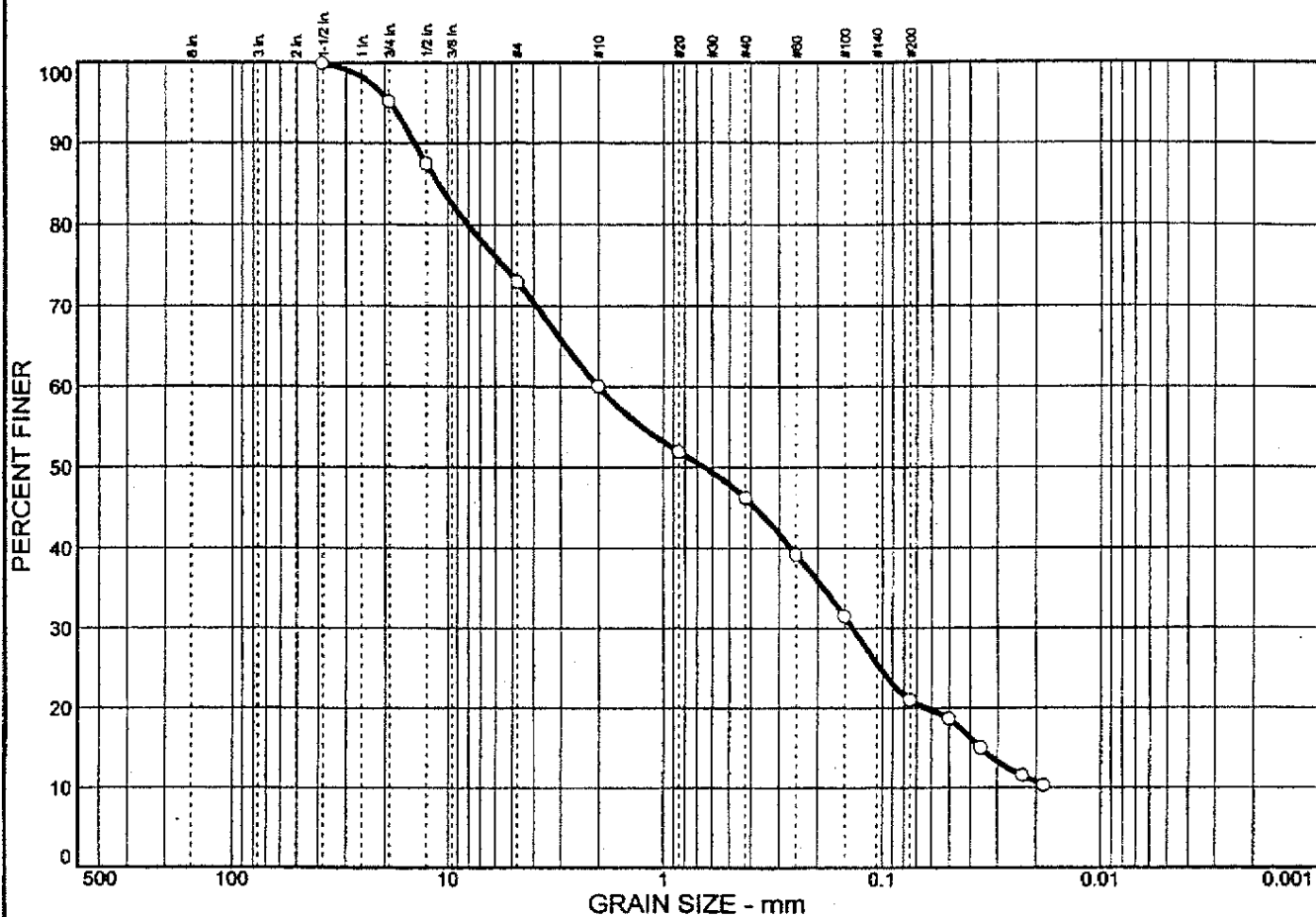
Date: 2/26/01
 Elev./Depth: 4.5-6.5

**A.W. Murfitt
 Company**

Client: U.S. Army Engineer District, Alaska
 Project: Family Housing Upgrade (FTW230)
 Fort Wainwright, Alaska
 Project No: 01-369.08

Plate 23

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	27.0	52.0	21.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5 in.	100.0		
.75 in.	95.2		
0.5 in.	87.5		
#4	73.0		
#10	60.0		
#20	51.9		
#40	46.2		
#60	39.2		
#100	31.5		
#200	21.0		

* (no specification provided)

Soil Description

Silty sand with gravel.
10.7% finer than 0.02mm.
Frost Class F 2.

Atterberg Limits

PL= NP

LL= NV

PI=

Coefficients

D₈₅= 11.1D₆₀= 2.00D₅₀= 0.653D₃₀= 0.137D₁₅= 0.0360D₁₀=C_u=C_c=

Classification

USCS= SM

AASHTO=

Remarks

Natural Moisture 28.0%.

Sample No.: 3

Source of Sample: AP-15

Date: 2/26/01

Location:

Elev./Depth: 9.5-11.5

**A.W. Murfitt
Company**

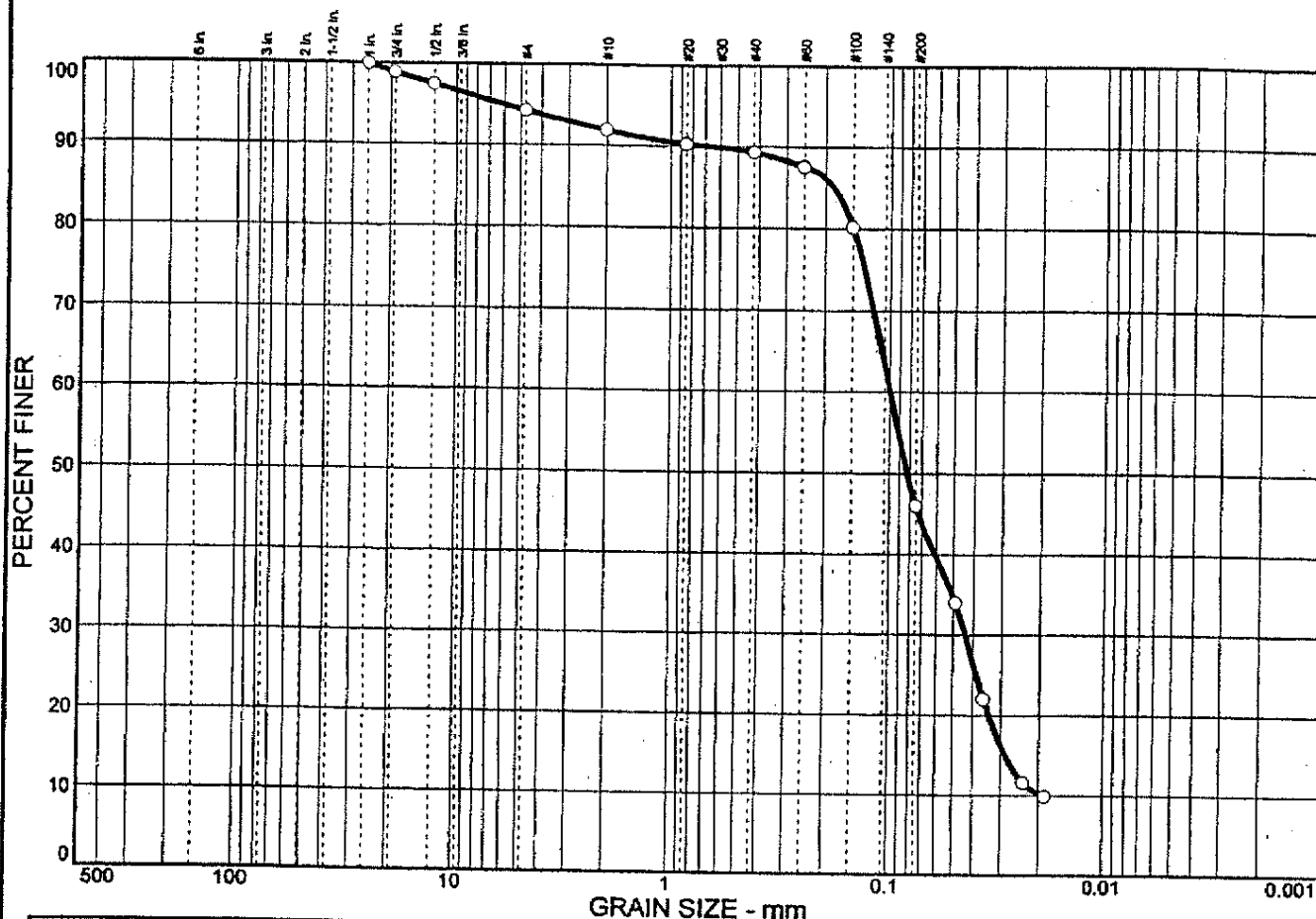
Client: U.S. Army Engineer District, Alaska
Project: Family Housing Upgrade (FTW230)
Fort Wainwright, Alaska

Project No: 01-369.08

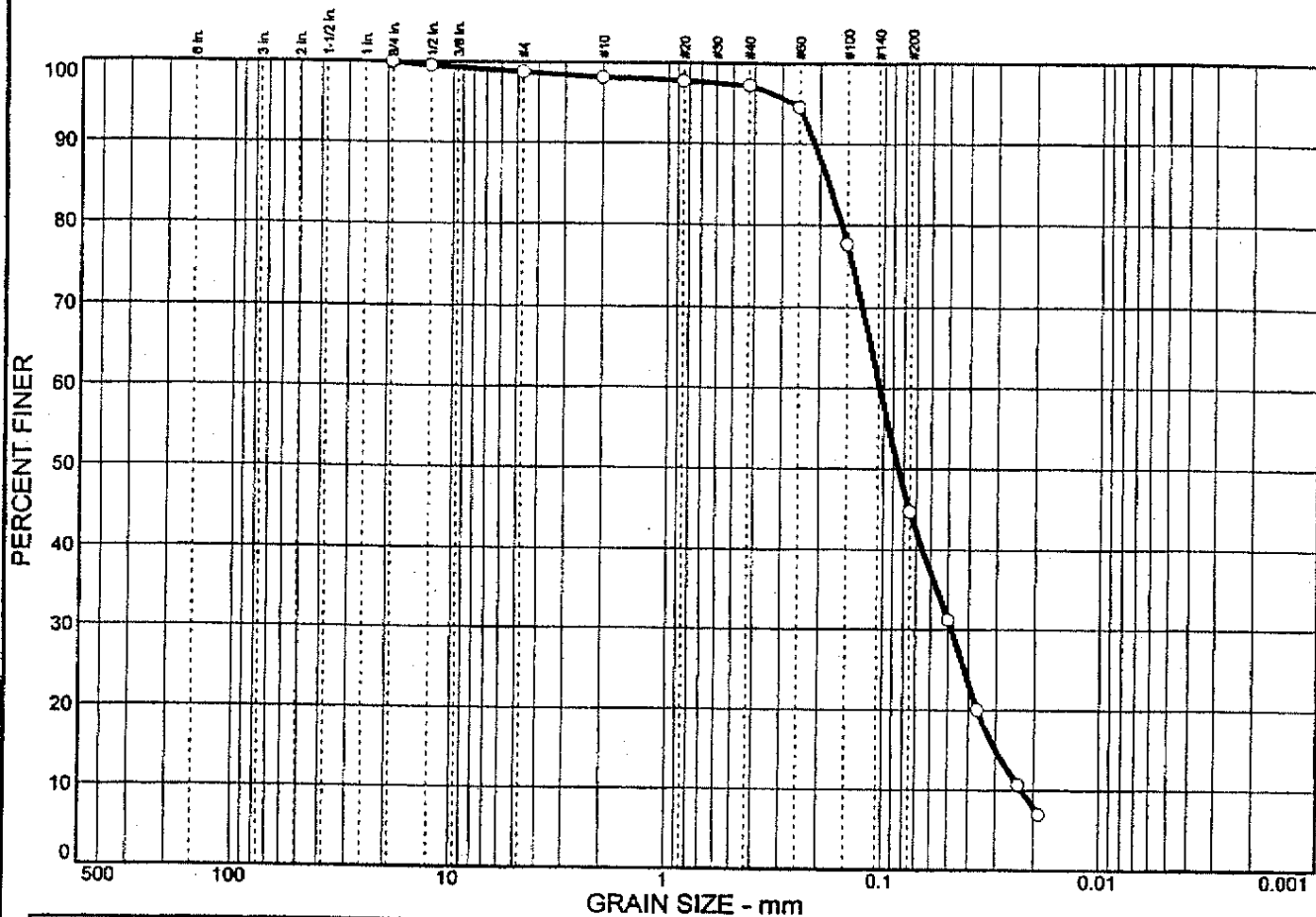
Plate

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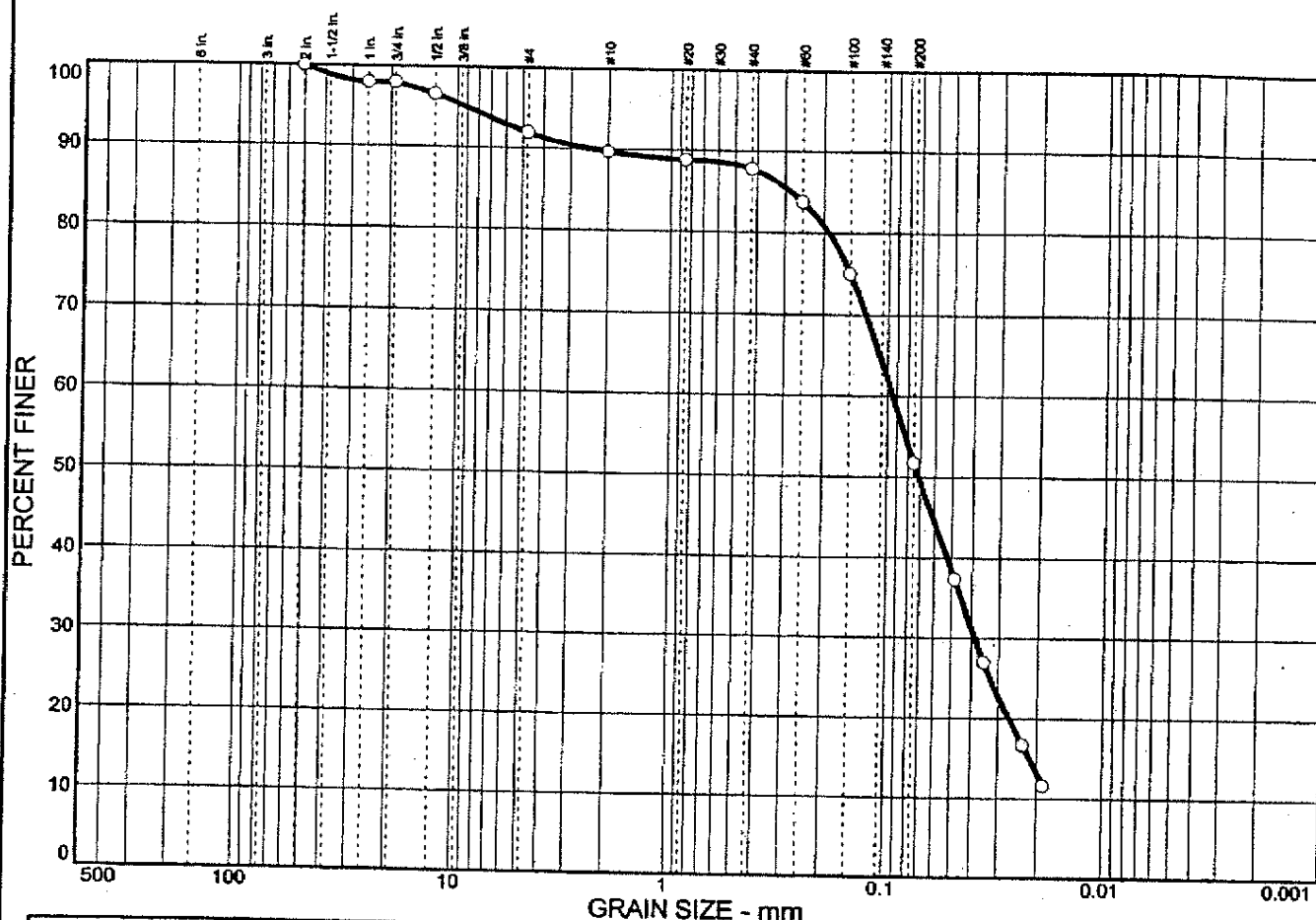
Particle Size Distribution Report



Particle Size Distribution Report



Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	8.1	40.2	51.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
2 in.	100.0		
1 in.	98.0		
.75 in.	98.0		
.5 in.	96.6		
#4	91.9		
#10	89.7		
#20	88.8		
#40	87.8		
#60	83.8		
#100	75.1		
#200	51.7		

* (no specification provided)

Soil Description

Sandy silt.
13.2% finer than 0.02mm.
Frost Class F 4.

Atterberg Limits

PL= NP LL= NV PI=

Coefficients

D₈₅= 0.281 D₆₀= 0.0946 D₅₀= 0.0713
D₃₀= 0.0389 D₁₅= 0.0215 D₁₀=
C_u= C_c=

Classification

USCS= ML AASHTO=

Remarks

Natural Moisture 16.5%.

Sample No.: 2
Location:

Source of Sample: AP-17

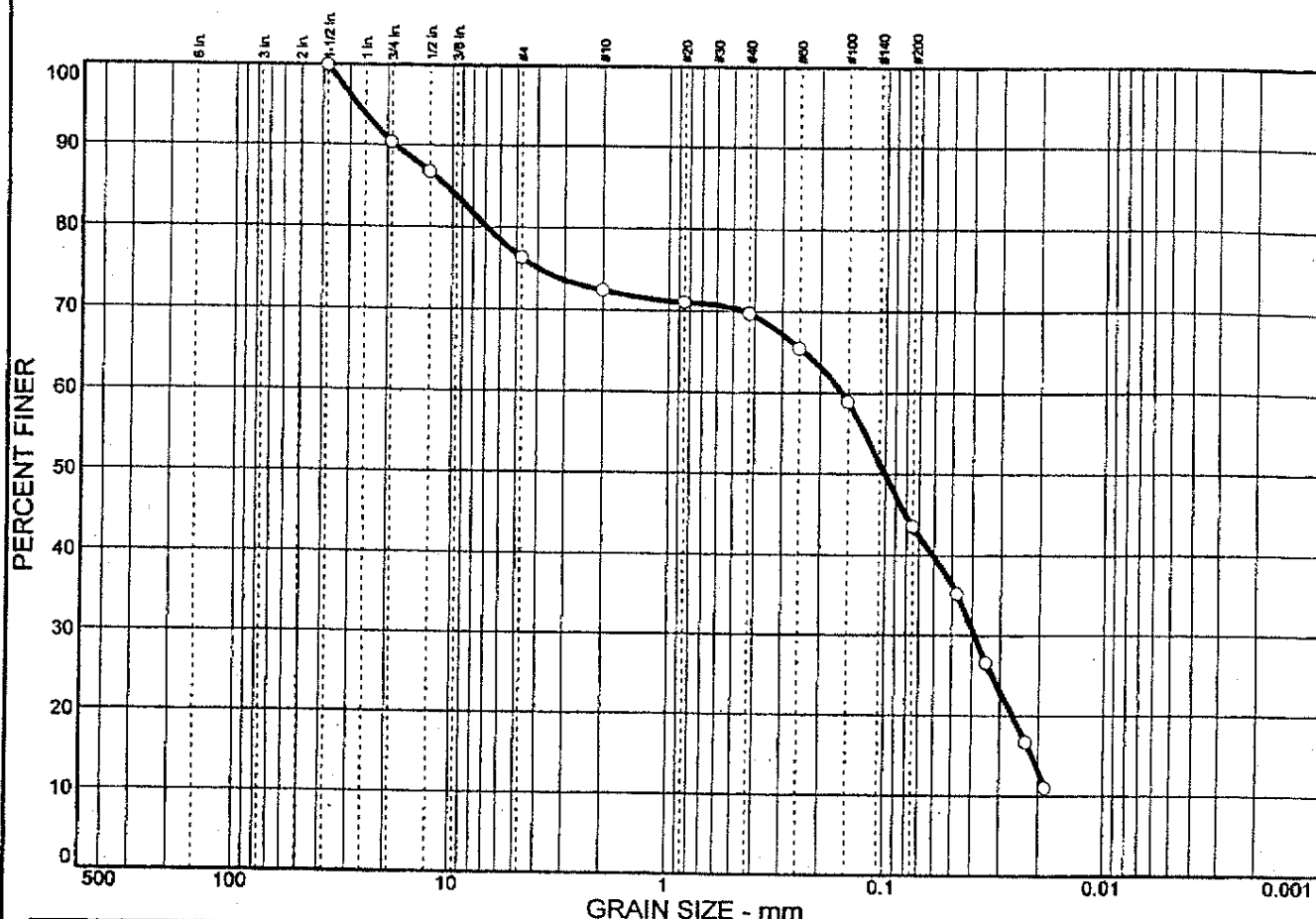
Date: 2/26/01
Elev./Depth: 4.5-6.5

**A.W. Murfitt
Company**

Client: U.S. Army Engineer District, Alaska
Project: Family Housing Upgrade (FTW230)
Fort Wainwright, Alaska
Project No: 01-369.08

Plate 27

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	23.7	32.8	43.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5 in.	100.0		
.75 in.	90.4		
.5 in.	86.8		
#4	76.3		
#10	72.4		
#20	71.0		
#40	69.7		
#60	65.5		
#100	58.9		
#200	43.5		

* (no specification provided)

Soil Description
 Silty sand with gravel.
 12.9% finer than 0.02mm.
 Frost Class F 2.

Atterberg Limits
 PL= NP LL= NV PI=

Coefficients
 D₈₅= 10.6 D₆₀= 0.160 D₅₀= 0.101
 D₃₀= 0.0391 D₁₅= 0.0214 D₁₀=
 C_u= C_c=

Classification
 USCS= SM AASHTO=

Remarks
 Natural Moisture 16.4.
 Sticks And Glass Present In Sample.

Sample No.: 3
 Location:

Source of Sample: AP-17

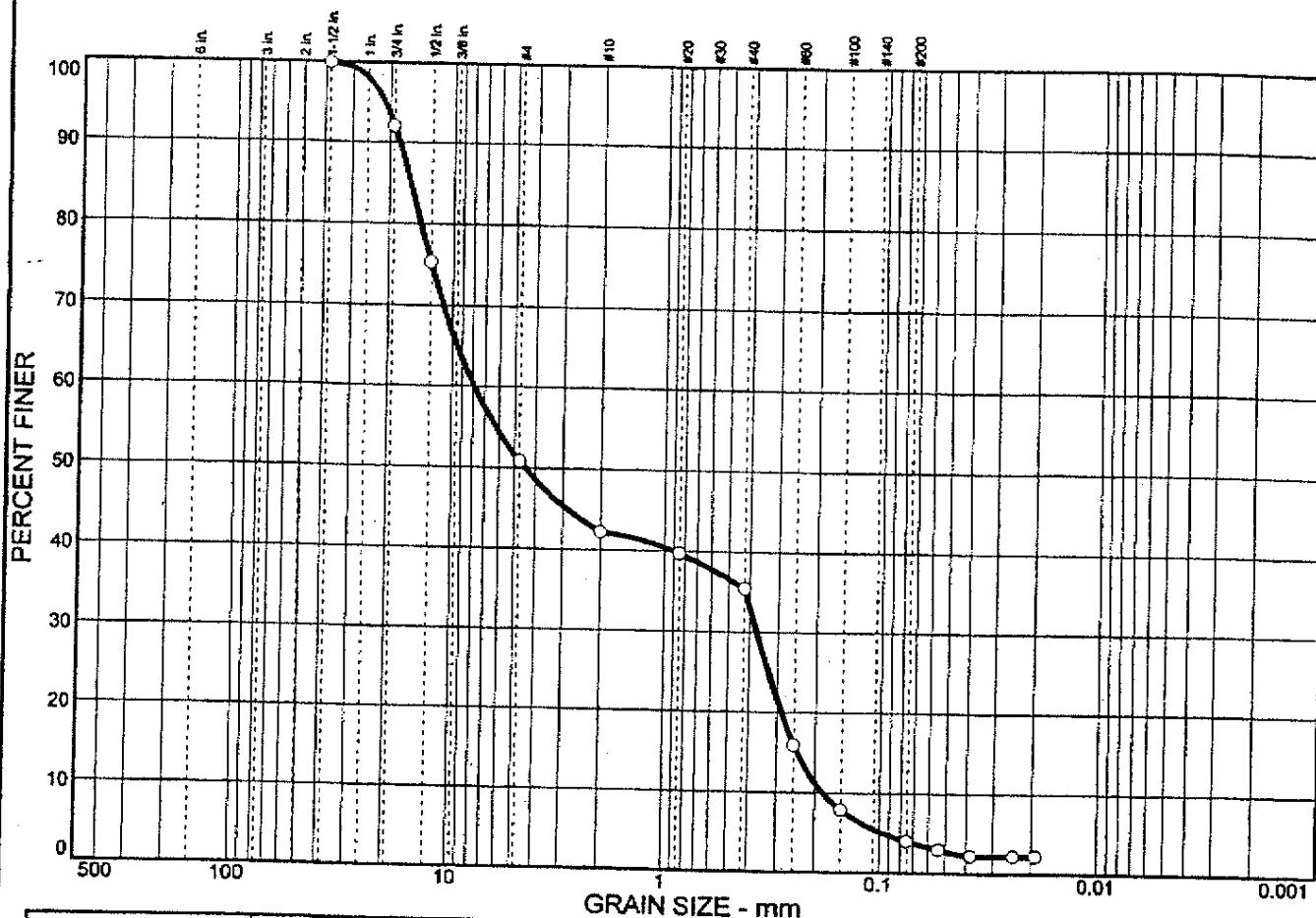
Date: 2/26/01
 Elev./Depth: 9.5-11.5

**A.W. Murfitt
 Company**

Client: U.S. Army Engineer District, Alaska
 Project: Family Housing Upgrade (FTW230)
 Fort Wainwright, Alaska
 Project No: 01-369.08

Plate 28

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	49.2	46.8	4.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5 in.	100.0		
.75 in.	92.1		
.5 in.	75.3		
#4	50.8		
#10	42.2		
#20	39.7		
#40	35.4		
#60	15.9		
#100	7.9		
#200	4.0		

* (no specification provided)

Soil Description
 Poorly graded gravel with sand.
 2.2% finer than 0.02mm.
 Possibly Frost Susceptible.

Atterberg Limits
 PL= NP LL= NV PI=

Coefficients
 D₈₅= 15.9 D₆₀= 7.88 D₅₀= 4.48
 D₃₀= 0.373 D₁₅= 0.241 D₁₀= 0.183
 C_u= 42.96 C_c= 0.10

Classification
 USCS= GP AASHTO=

Remarks
 Natural Moisture 9.9%.

Sample No.: 4b
 Location:

Source of Sample: AP-17

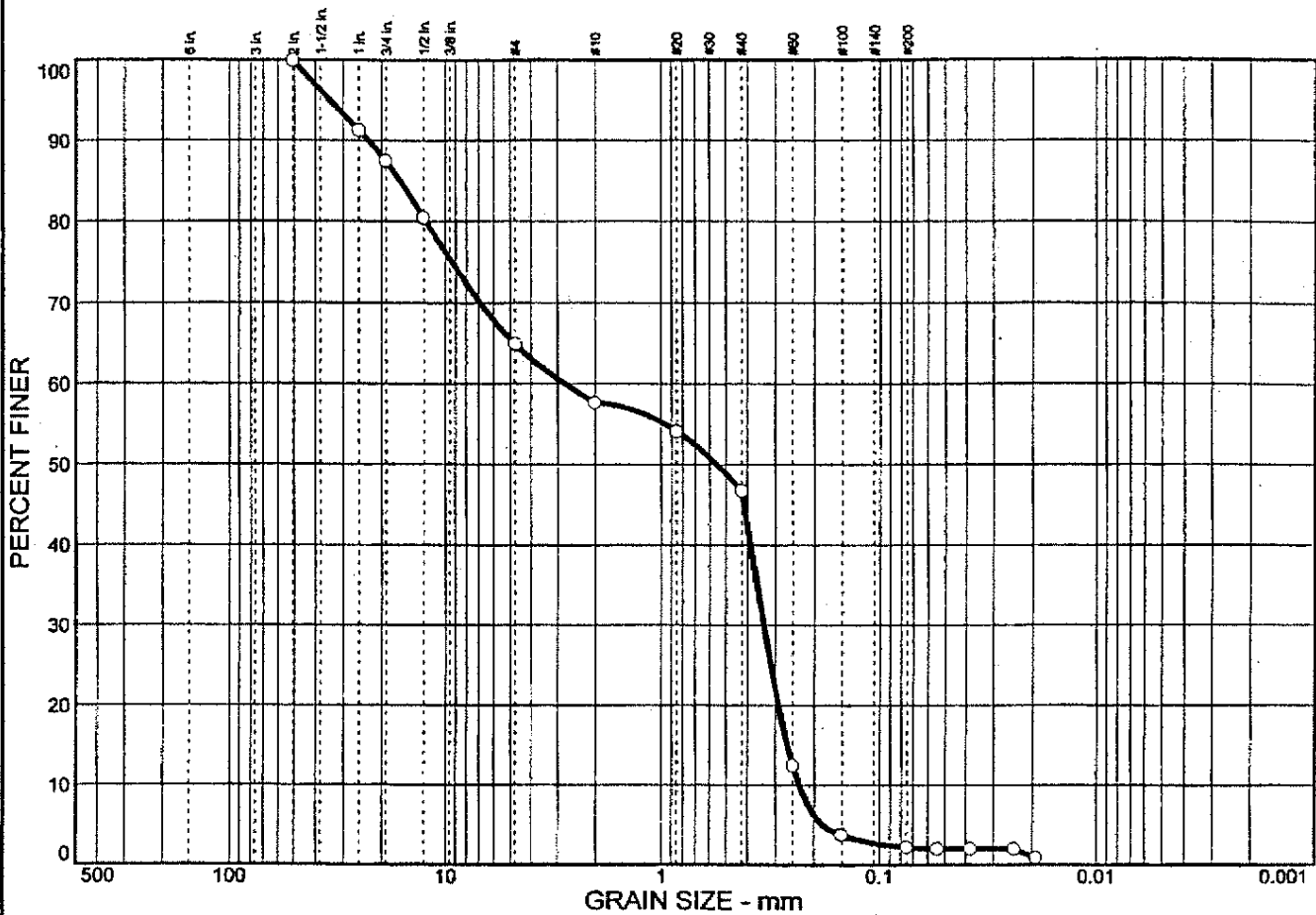
Date: 2/26/01
 Elev./Depth: 14.5-16.5

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Company**

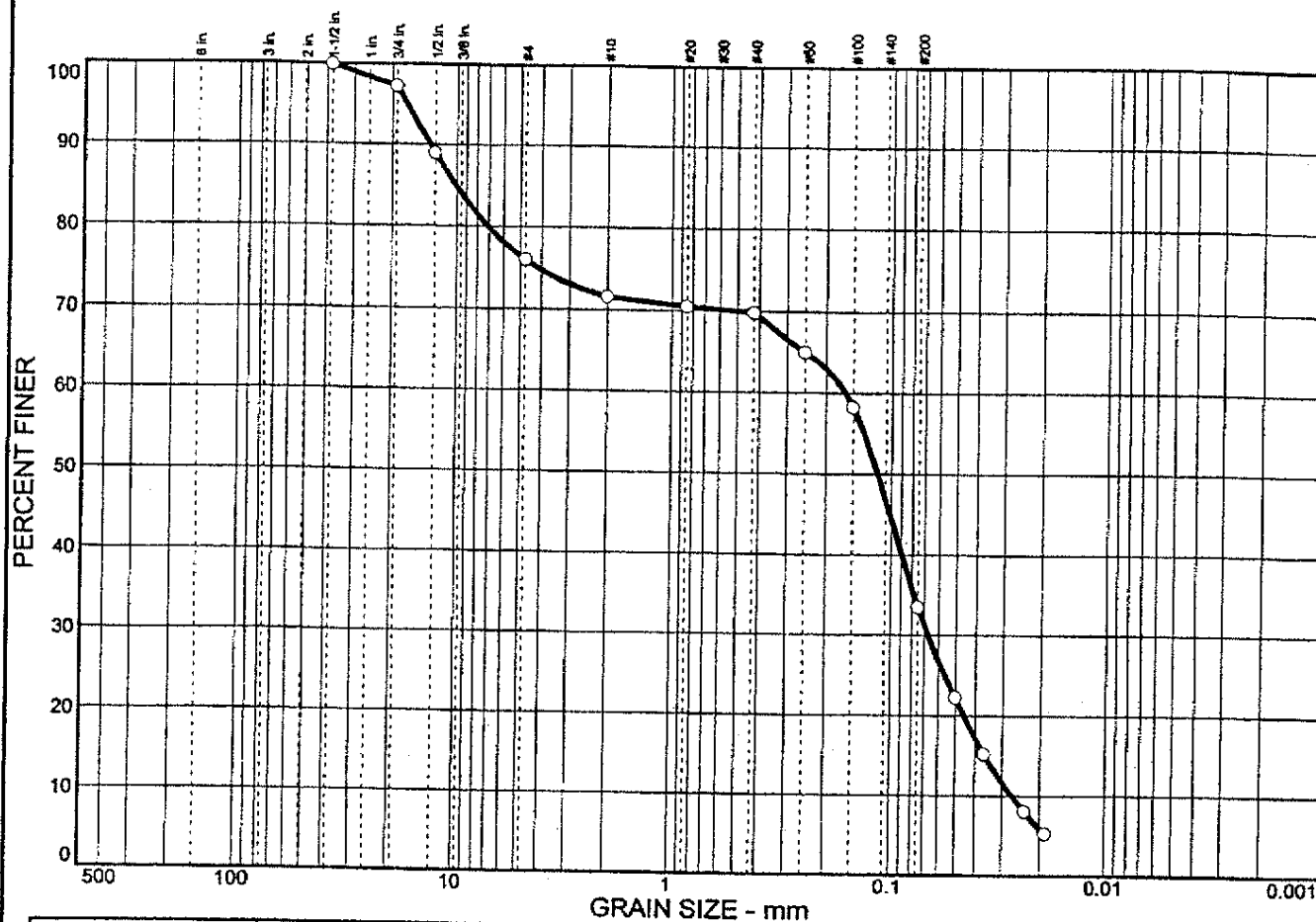
Client: U.S. Army Engineer District, Alaska
 Project: Family Housing Upgrade (FTW230)
 Fort Wainwright, Alaska
 Project No: 01-369.08

Plate 57

Particle Size Distribution Report



Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	24.0	42.5	33.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5 in.	100.0		
.75 in.	97.3		
.5 in.	89.0		
#4	76.0		
#10	71.6		
#20	70.5		
#40	69.8		
#60	65.0		
#100	58.2		
#200	33.5		

* (no specification provided)

Soil Description

Silty sand with gravel.
5.9% finer than 0.02mm.
Frost Class S 2.

Atterberg Limits

PL= NP

LL= NV

PI=

Coefficients

D₈₅= 10.1

D₆₀= 0.163

D₅₀= 0.116

D₃₀= 0.0672

D₁₅= 0.0361

D₁₀= 0.0271

C_u= 6.02

C_c= 1.03

Classification

USCS= SM

AASHTO=

Remarks

Natural Moisture 13.3%.

Sample No.: 2

Location:

Source of Sample: AP-19

Date: 2/26/01

Elev./Depth: 4.5-6.5

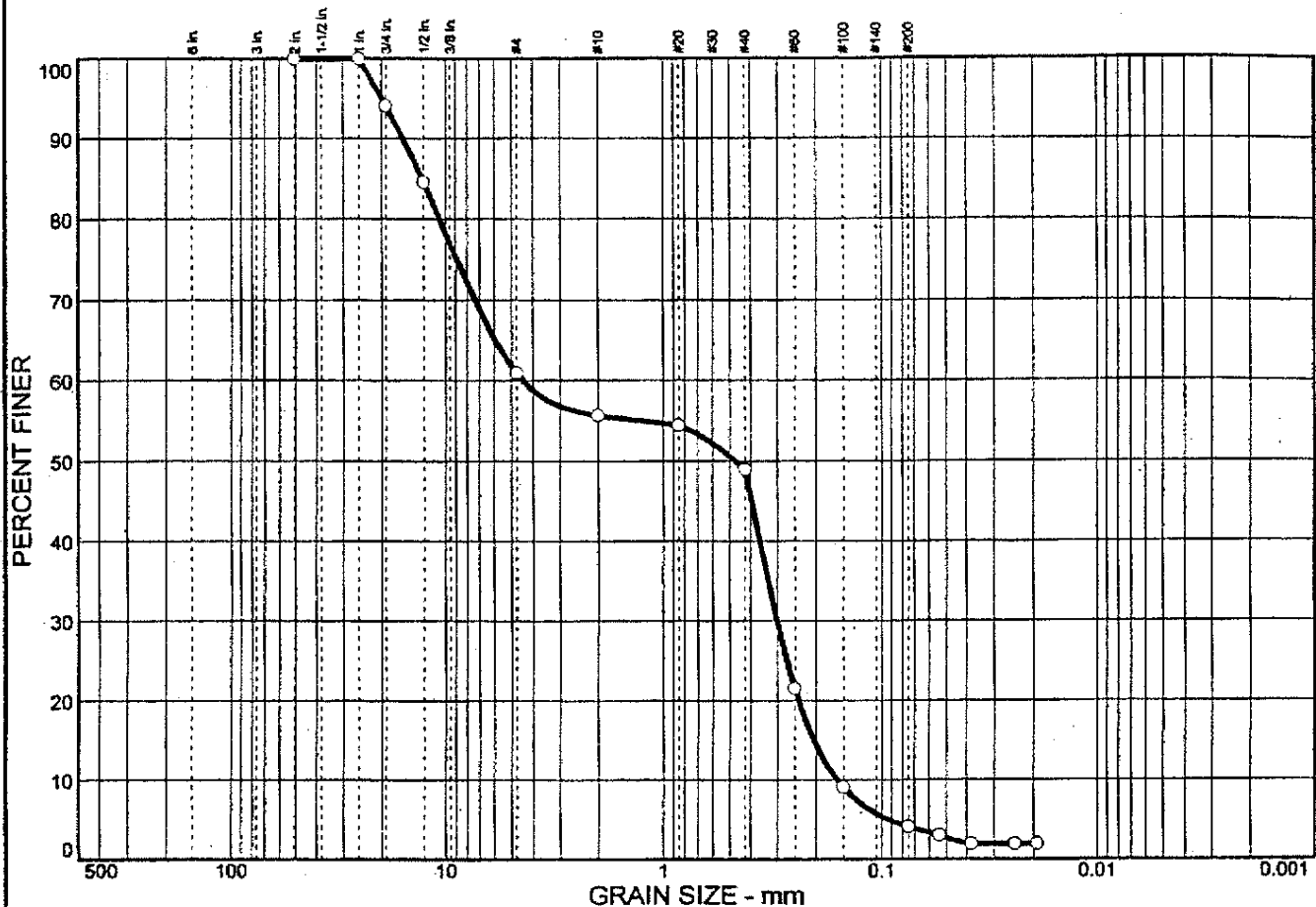
**A.W. Murfitt
Company**

Client: U.S. Army Engineer District, Alaska
Project: Family Housing Upgrade (FTW230)
Fort Wainwright, Alaska

Project No: 01-369.08

Plate 30

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	39.1	56.8	4.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
2 in.	100.0		
1 in.	100.0		
.75 in.	94.1		
.5 in.	84.6		
#4	60.9		
#10	55.6		
#20	54.4		
#40	48.9		
#60	21.5		
#100	9.1		
#200	4.1		

* (no specification provided)

Soil Description
 Poorly graded sand with gravel.
 1.9% finer than 0.075 mm.
 Non Frost Susceptible.

Atterberg Limits
 PL= NP LL= NV PI=

Coefficients
 D₈₅= 12.9 D₆₀= 4.45 D₅₀= 0.472
 D₃₀= 0.302 D₁₅= 0.204 D₁₀= 0.160
 C_u= 27.90 C_c= 0.13

Classification
 USCS= SP AASHTO=

Remarks
 Natural Moisture 2.9%.

Sample No.: 3
 Location:

Source of Sample: AP-19

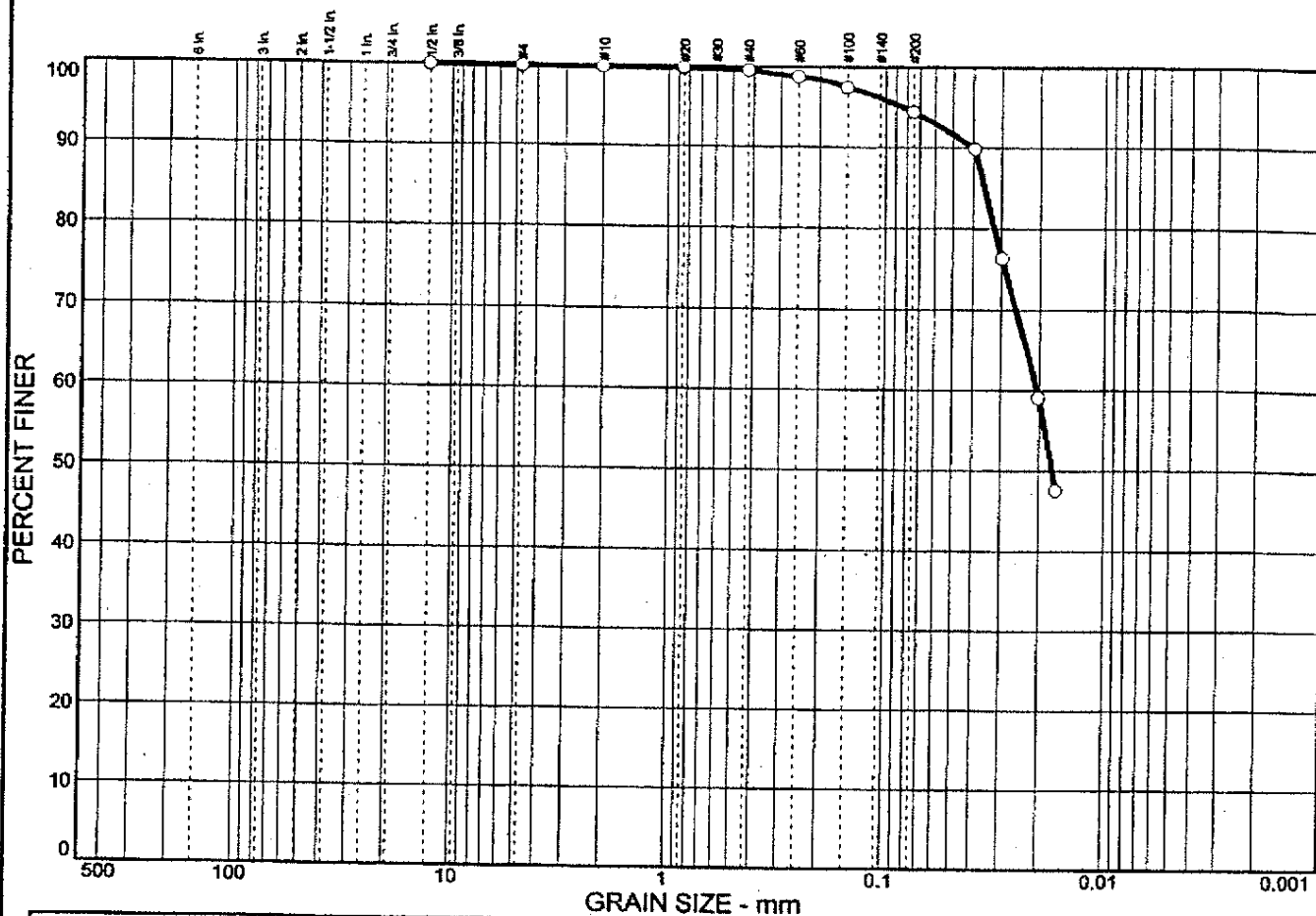
Date: 2/26/01
 Elev./Depth: 9.5-11.5

**A.W. Murfitt
 Company**

Client: U.S. Army Engineer District, Alaska
 Project: Family Housing Upgrade (FTW230)
 Fort Wainwright, Alaska
 Project No: 01-369.08

Plate 31

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	0.1	5.5	94.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.5 in.	100.0		
#4	99.9		
#10	99.8		
#20	99.8		
#40	99.6		
#60	98.8		
#100	97.5		
#200	94.4		

* (no specification provided)

Soil Description

Silt.
58.4% finer than 0.02mm.
Frost Class F 4.

Atterberg Limits

PL= NP LL= NV PI=

Coefficients

D₈₅= 0.0358 D₆₀= 0.0206 D₅₀= 0.0174
D₃₀= D₁₅= D₁₀=
C_u= C_c=

Classification

USCS= ML AASHTO=

Remarks

Natural Moisture 34.3%.
Sticks And Organics Present In Sample.

Sample No.: 2
Location:

Source of Sample: AP-20

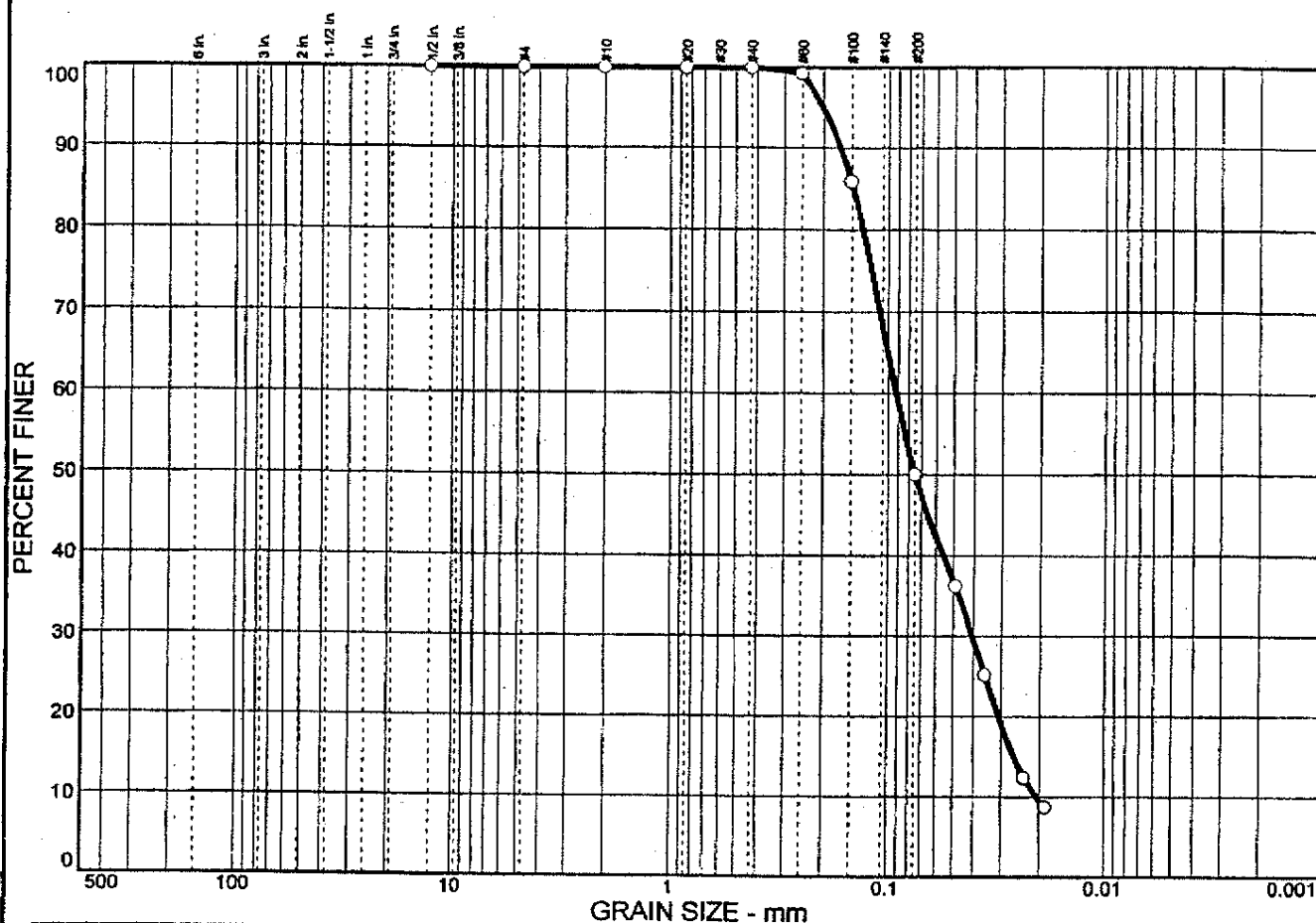
Date: 2/26/01
Elev./Depth: 5.0-7.0

**A.W. Murfitt
Company**

Client: U.S. Army Engineer District, Alaska
Project: Family Housing Upgrade (FTW230)
Fort Wainwright, Alaska
Project No: 01-369.08

Plate 32

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	0.0	50.0	50.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.50 in.	100.0		
#4	100.0		
#10	100.0		
#20	100.0		
#40	100.0		
#60	99.3		
#100	85.9		
#200	50.0		

* (no specification provided)

Soil Description

Sandy silt.
9.6% finer than 0.075mm.
Frost Class F 4.

Atterberg Limits

PL= NP LL= NV PI=

Coefficients

D₈₅= 0.147 D₆₀= 0.0920 D₅₀= 0.0750
D₃₀= 0.0408 D₁₅= 0.0262 D₁₀= 0.0206
C_u= 4.47 C_c= 0.88

Classification

USCS= ML AASHTO=

Remarks

Natural Moisture 22.4%.

Sample No.: 3

Location:

Source of Sample: AP-20

Date: 2/26/01

Elev./Depth: 10.0-12.0

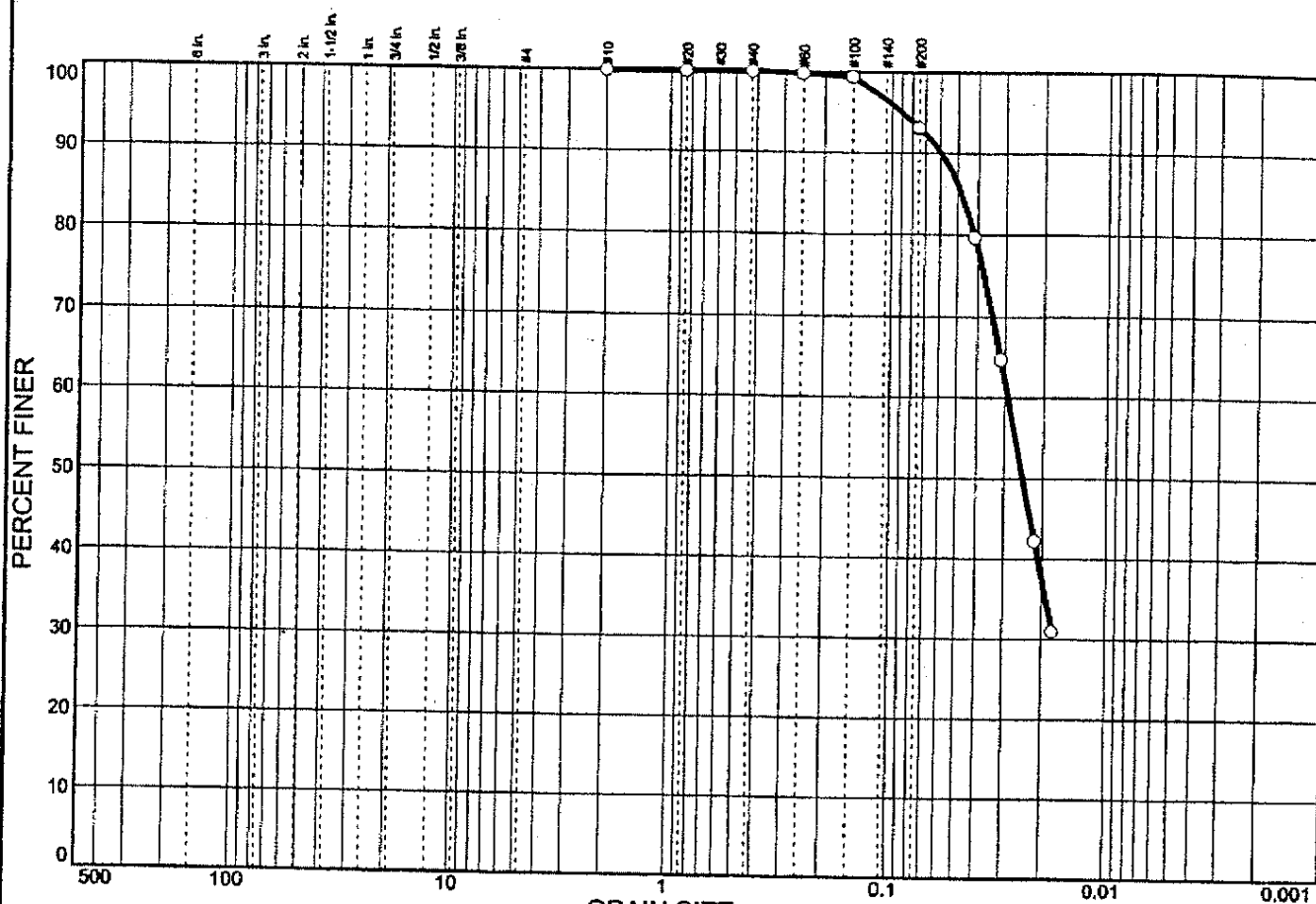
**A.W. Murfitt
Company**

Client: U.S. Army Engineer District, Alaska
Project: Family Housing Upgrade (FTW230)
Fort Wainwright, Alaska

Project No: 01-369.08

Plate 33

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	0.0	6.8	93.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	100.0		
#40	100.0		
#60	99.8		
#100	99.4		
#200	93.2		

* (no specification provided)

Soil Description

Silt.
37.3% finer than 0.02mm.
Frost Class F 4.

Atterberg Limits

PL= NP LL= NV PI=

Coefficients

D₈₅= 0.0480 D₆₀= 0.0291 D₅₀= 0.0247
D₃₀= D₁₅=
C_u= C_c=

Classification

USCS= ML AASHTO=

Remarks

Natural Moisture 38.3%.

Sample No.: 3
Location:

Source of Sample: AP-21

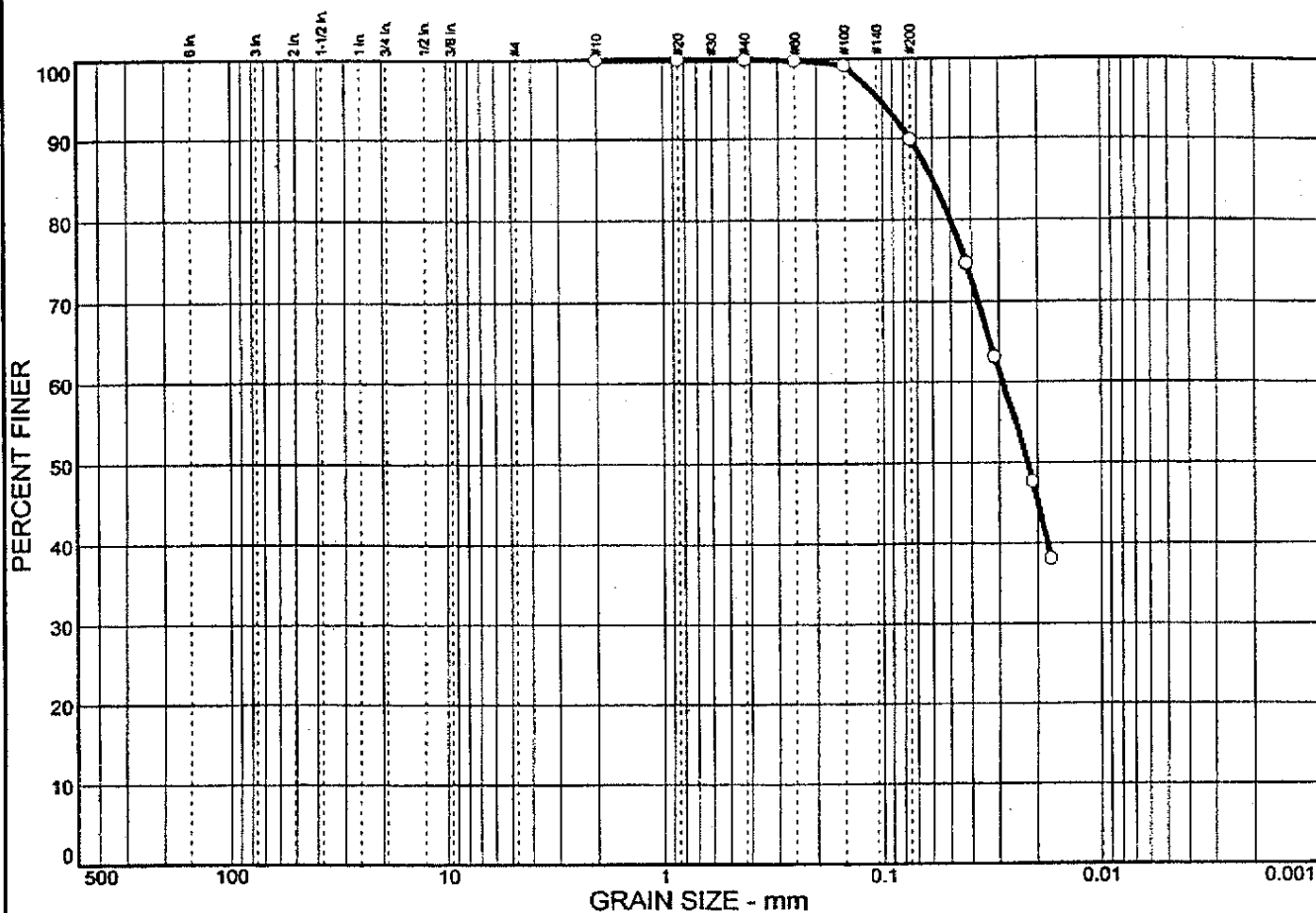
Date: 2/26/01
Elev./Depth: 9.5-11.5

**A.W. Murfitt
Company**

Client: U.S. Army Engineer District, Alaska
Project: Family Housing Upgrade (FTW230)
Fort Wainwright, Alaska
Project No: 01-369.08

Plate 34

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	0.0	10.1	89.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	100.0		
#40	100.0		
#60	99.8		
#100	99.2		
#200	89.9		

* (no specification provided)

Soil Description

Silt.
44.9% finer than 0.02mm.
Frost Class F 4.

Atterberg Limits

PL= NP LL= NV PI=

Coefficients

D₈₅= 0.0598 D₆₀= 0.0290 D₅₀= 0.0223
D₃₀= D₁₅= D₁₀=
C_u= C_c=

Classification

USCS= ML AASHTO=

Remarks

Natural Moisture 40.0%.

Sample No.: 4
Location:

Source of Sample: AP-21

Date: 2/26/01
Elev./Depth: 14.5-16.5

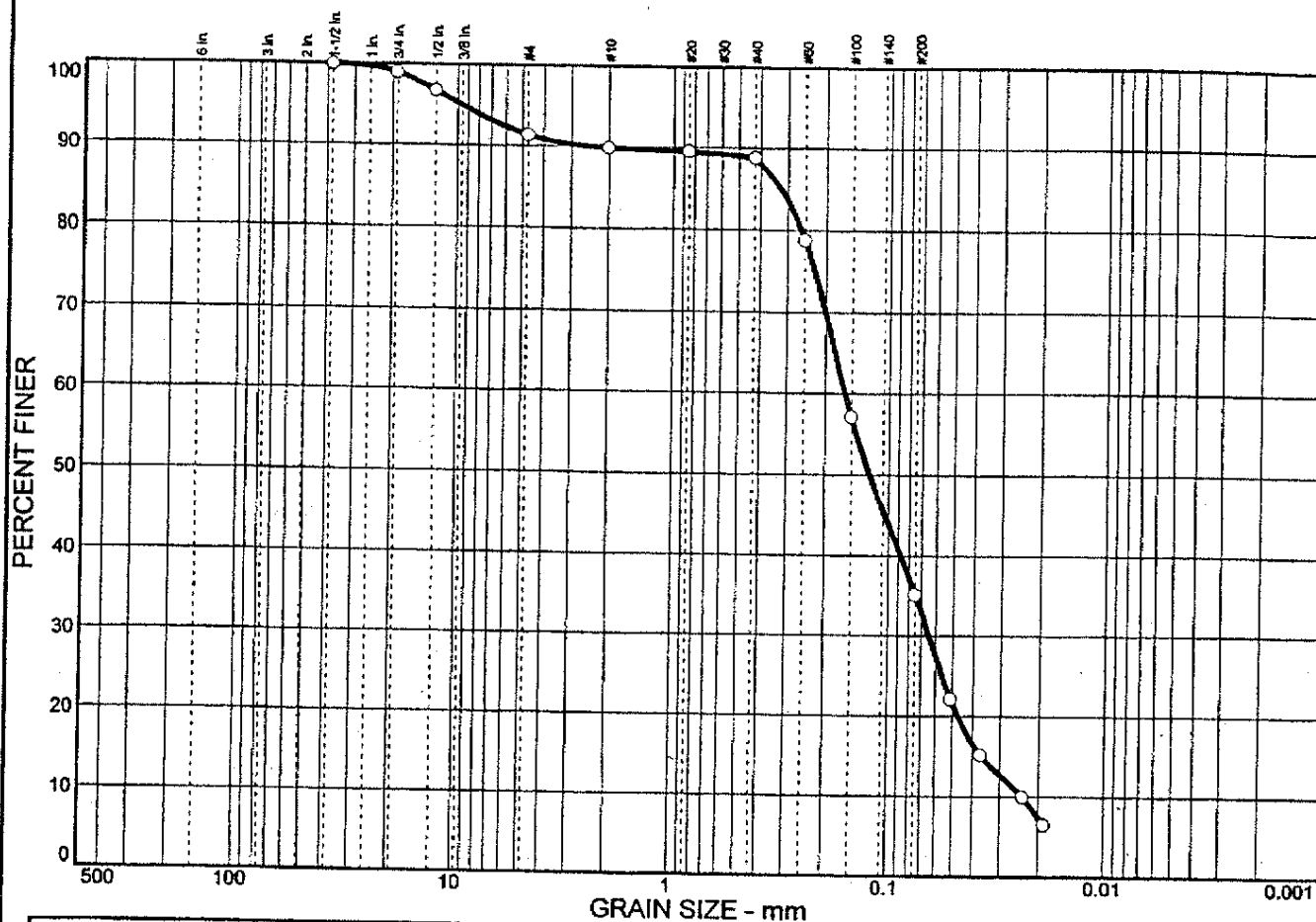
**A.W. Murfitt
Company**

Client: U.S. Army Engineer District, Alaska
Project: Family Housing Upgrade (FTW230)
Fort Wainwright, Alaska

Project No: 01-369.08

Plate 35

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	8.6	56.2	35.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5 in.	100.0		
.75 in.	99.0		
.5 in.	96.8		
#4	91.4		
#10	89.8		
#20	89.5		
#40	88.8		
#60	78.8		
#100	57.1		
#200	35.2		

* (no specification provided)

Soil Description

Silty sand.
7.3% finer than 0.02mm.
Frost Class F 2.

Atterberg Limits

PL= NP LL= NV PI=

Coefficients

D₈₅= 0.321 D₆₀= 0.161 D₅₀= 0.123
D₃₀= 0.0646 D₁₅= 0.0363 D₁₀= 0.0237
C_u= 6.79 C_c= 1.09

Classification

USCS= SM AASHTO=

Remarks

Natural Moisture 10.4%.

Sample No.: 2

Location:

Source of Sample: AP-22

Date: 2/26/01

Elev./Depth: 4.5-6.5

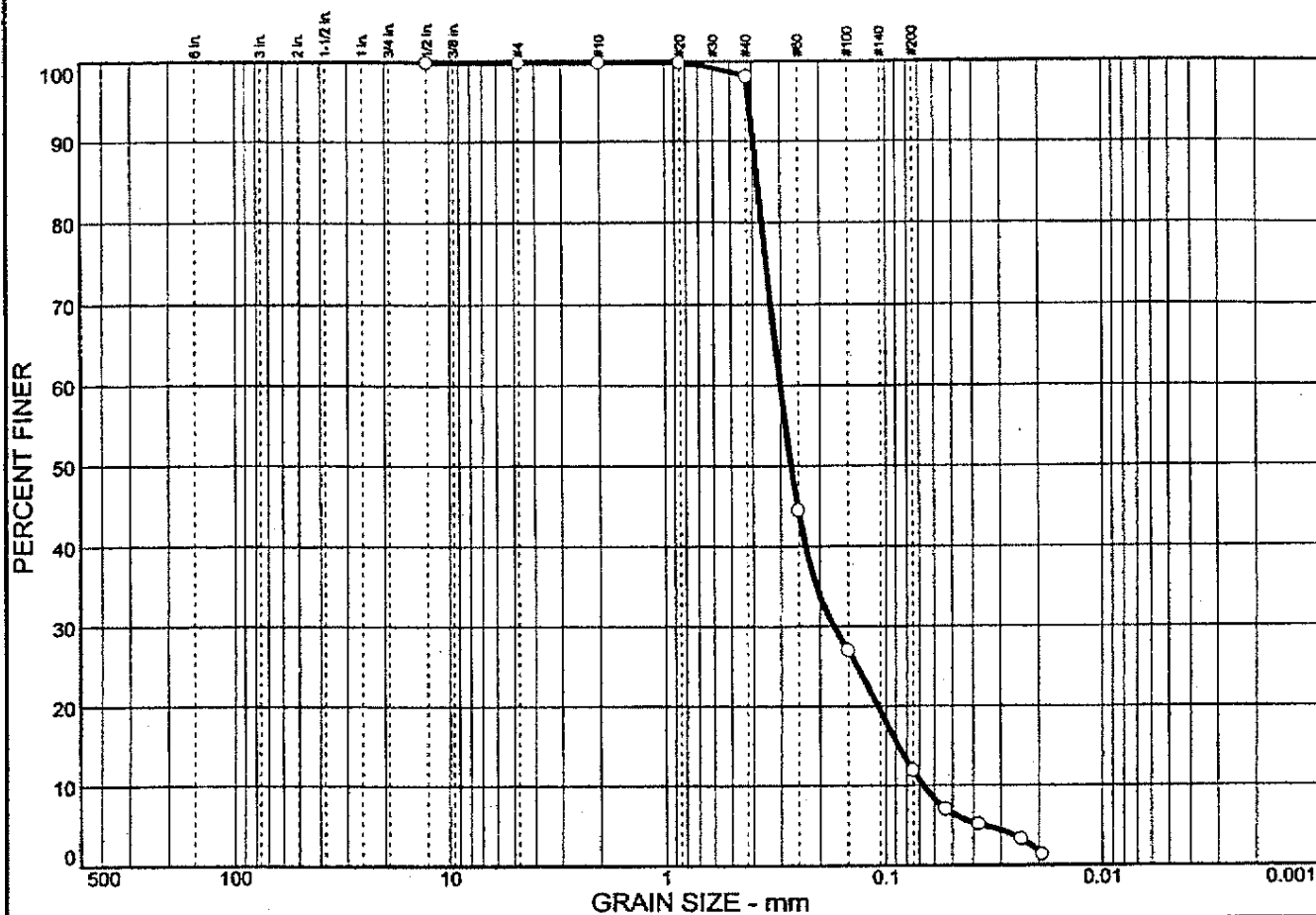
**A.W. Murfitt
Company**

Client: U.S. Army Engineer District, Alaska
Project: Family Housing Upgrade (FTW230)
Fort Wainwright, Alaska

Project No: 01-369.08

Plate 36

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	0.1	88.0	11.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.50 in.	100.0		
#4	99.9		
#10	99.9		
#20	99.9		
#40	98.2		
#60	44.5		
#100	27.0		
#200	11.9		

(no specification provided)

Soil Description
 Poorly graded sand with silt.
 1.7% finer than 0.02mm.
 Non Frost Susceptible.

Atterberg Limits
 PL= NP LL= NV PI=

Coefficients
 D₈₅= 0.380 D₆₀= 0.301 D₅₀= 0.269
 D₃₀= 0.174 D₁₅= 0.0875 D₁₀= 0.0672
 C_u= 4.49 C_c= 1.49

Classification
 USCS= SP-SM AASHTO=

Remarks
 Natural Moisture 7.3%.

Sample No.: 3
 Location:

Source of Sample: AP-22

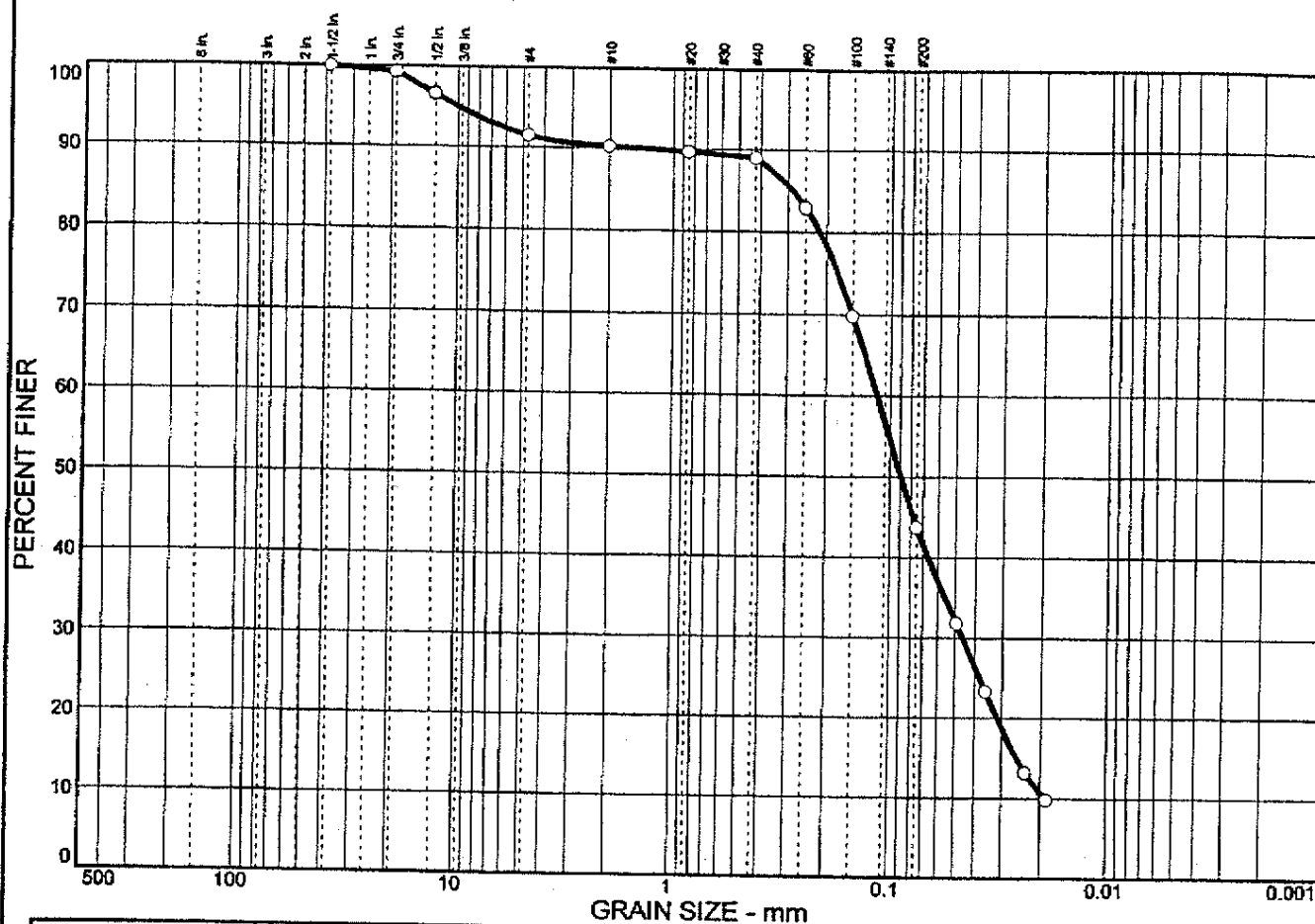
Date: 2/26/01
 Elev./Depth: 9.5-11.5

**A.W. Murfitt
 Company**

Client: U.S. Army Engineer District, Alaska
 Project: Family Housing Upgrade (FTW230)
 Fort Wainwright, Alaska
 Project No: 01-369.08

Plate 37

Particle Size Distribution Report



GRAIN SIZE - mm				
% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	8.5	47.8	43.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5 in.	100.0		
.75 in.	99.3		
.5 in.	96.6		
#4	91.5		
#10	90.2		
#20	89.7		
#40	89.0		
#60	83.0		
#100	69.8		
#200	43.7		

Soil Description

Silty sand.
10.7% finer than 0.02mm.
Frost Class F 2.

Atterberg Limits

PL= NP Atterberg Limits PI=

Coefficients

$D_{85} = 0.285$	$D_{60} = 0.115$	$D_{50} = 0.0895$
$D_{30} = 0.0459$	$D_{15} = 0.0257$	$D_{10} = 0.0190$
$C_u = 6.08$	$C_c = 0.96$	

Classification

USCS= SM Classification
AASHTO=

Remarks

Natural Moisture 18.4%.
Sticks Present In Sample.

★ (no specification provided)

Sample No.: 2
Location:

Source of Sample: AP-23

Date: 2/26/01
Elev./Depth: 4.5-6.5

**A.W. Murfitt
Company**

Client: U.S. Army Engineer District, Alaska
Project: Family Housing Upgrade (FTW230)
Fort Wainwright, Alaska
Project No: 01-369.08

Plate 38

FY01 REPLACEMENT FAMILY HOUSING



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	1.1	77.0	21.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75 in.	100.0		
.5 in.	99.3		
#4	98.9		
#10	98.8		
#20	98.8		
#40	96.3		
#60	68.6		
#100	41.3		
#200	21.9		

(no specification provided)

Soil Description

Silty sand.
11.0% finer than 0.02mm.
Frost Class F 2.

Atterberg Limits

$$\text{PL} = \text{NP} \qquad \frac{\text{LL} = \text{NV}}{\text{PI} =}$$

Coefficients

D ₈₅ = 0.340	D ₆₀ = 0.215	D ₅₀ = 0.179
D ₃₀ = 0.107	D ₁₅ = 0.0528	D ₁₀ =
C _u =	C _c =	

Classification

USCS= SM AASHTO=

Remarks

Natural Moisture 27.6%.

Sample No.: 4
Location:

Source of Sample: AP-23

Date: 2/26/01
Elev./Depth: 14.5-16.5

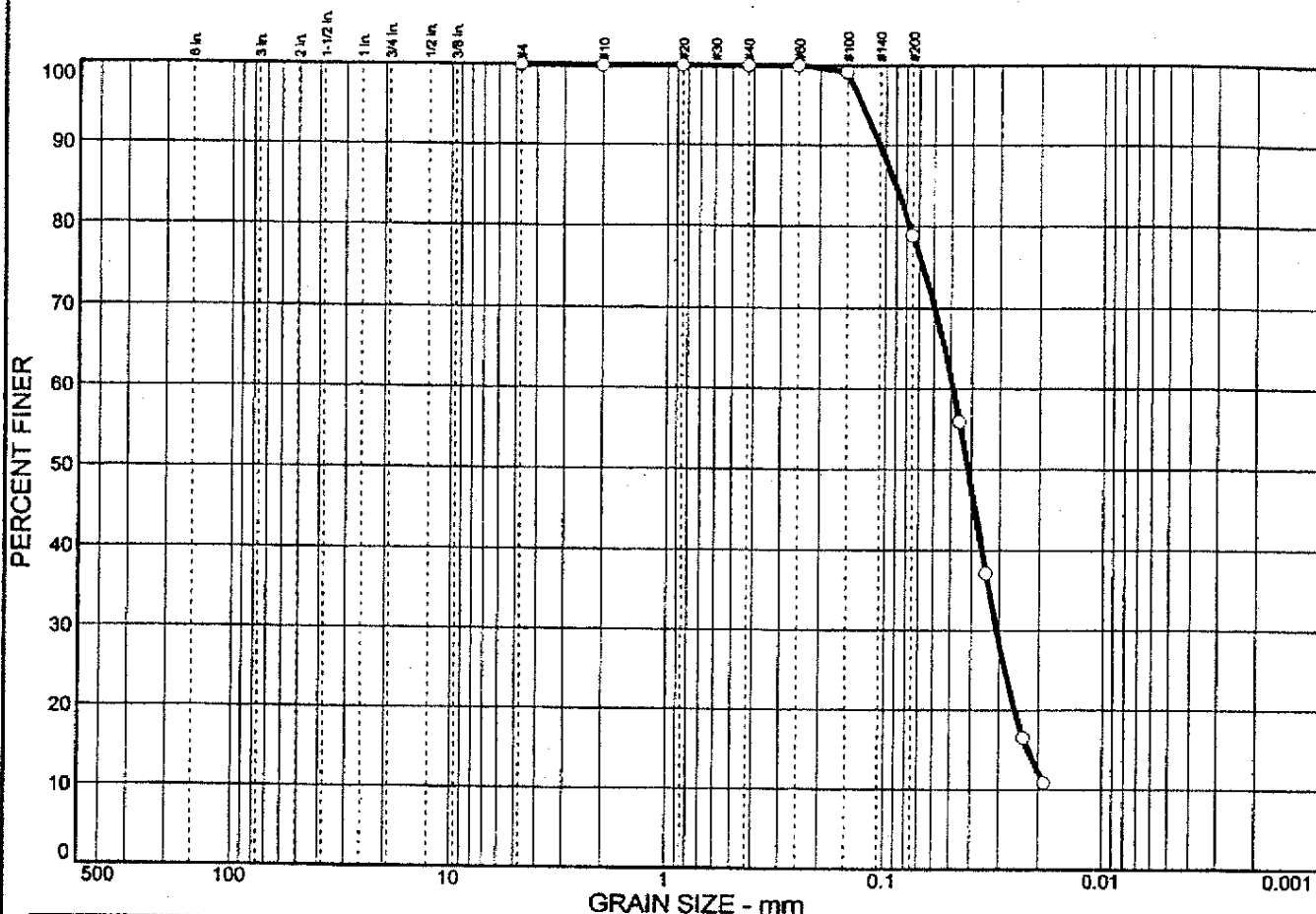
**A.W. Murfitt
Company**

Client: U.S. Army Engineer District, Alaska
Project: Family Housing Upgrade (FTW230)
Fort Wainwright, Alaska

Project No: 01-369.08

Plate 39

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	0.0	21.1	78.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	100.0		
#20	100.0		
#40	100.0		
#60	100.0		
#100	99.2		
#200	78.9		

* (no specification provided)

Soil Description

Silt with sand.
12.4% finer than 0.075mm.
Frost Class F 4.

Atterberg Limits

PL= NP LL= NV PI=

Coefficients

D₈₅= 0.0901 D₆₀= 0.0488 D₅₀= 0.0416
D₃₀= 0.0309 D₁₅= 0.0222 D₁₀=
C_u= C_c=

Classification

USCS= ML AASHTO=

Remarks

Natural Moisture 2.3%.

Sample No.: 2
Location:

Source of Sample: AP-24

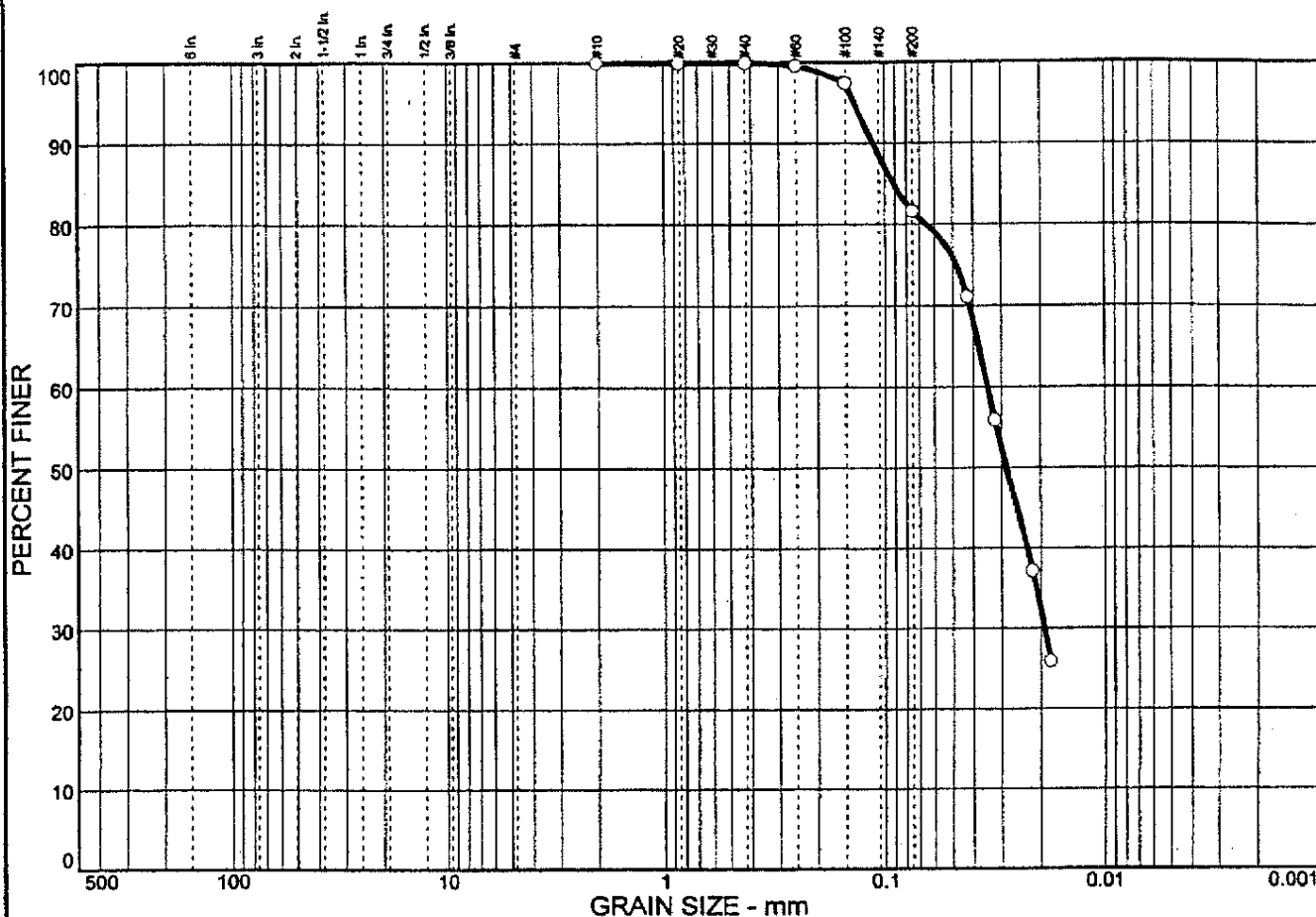
Date: 2/26/01
Elev./Depth: 4.5-6.5

**A.W. Murfitt
Company**

Client: U.S. Army Engineer District, Alaska
Project: Family Housing Upgrade (FTW230)
Fort Wainwright, Alaska
Project No: 01-369.08

Plate 40

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	0.0	18.4	81.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	100.0		
#40	100.0		
#60	99.6		
#100	97.5		
#200	81.6		

* (no specification provided)

Soil Description

Silt with sand.
31.9% finer than 0.02mm.
Frost Class F 4.

Atterberg Limits

PL= NP LL= NV PI=

Coefficients

D₈₅= 0.0913 D₆₀= 0.0347 D₅₀= 0.0286
D₃₀= 0.0192 D₁₅= D₁₀=
C_u= C_c=

Classification

USCS= ML AASHTO=

Remarks

Natural Moisture 39.9%.
Depth On The Lab Request Form Does Not Match Depth On Bag.

Sample No.: 3
Location:

Source of Sample: AP-24

Date: 2/26/01
Elev./Depth: 9.5-11.0

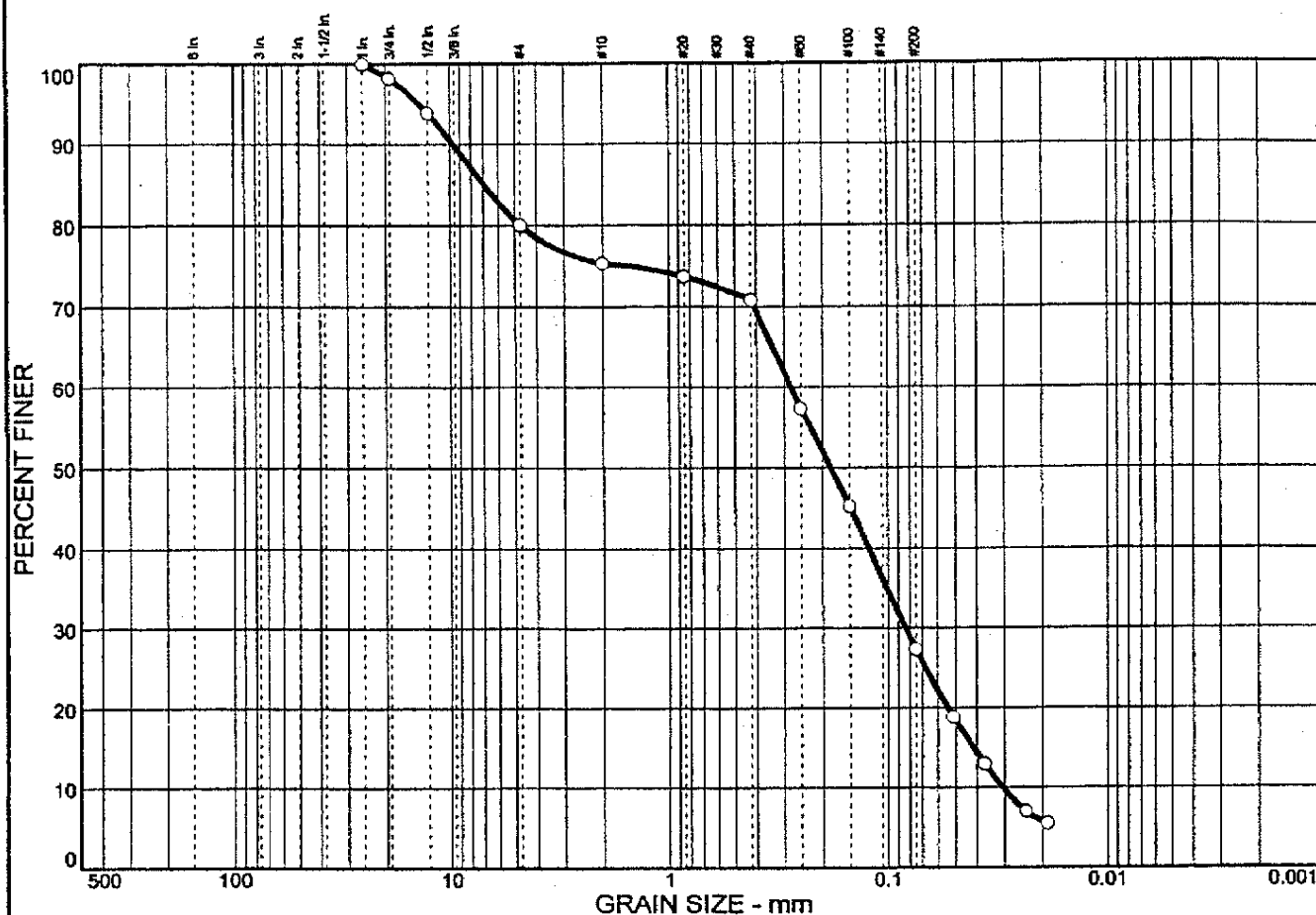
**A.W. Murfitt
Company**

Client: U.S. Army Engineer District, Alaska
Project: Family Housing Upgrade (FTW230)
Fort Wainwright, Alaska

Project No: 01-369.08

Plate 41

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	19.9	52.8	27.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 in.	100.0		
.75 in.	98.2		
.5 in.	93.9		
#4	80.1		
#10	75.3		
#20	73.7		
#40	70.8		
#60	57.3		
#100	45.2		
#200	27.3		

* (no specification provided)

Soil Description
 Silty sand with gravel.
 5.8% finer than 0.02mm.
 Frost Class S 2.

Atterberg Limits
 PL= NP LL= NV PI=

Coefficients
 D₈₅= 6.95 D₆₀= 0.279 D₅₀= 0.183
 D₃₀= 0.0836 D₁₅= 0.0416 D₁₀= 0.0307
 C_u= 9.10 C_c= 0.82

Classification
 USCS= SM AASHTO=

Remarks
 Natural Moisture 9.0%.

Sample No.: 3
 Location:

Source of Sample: AP-25

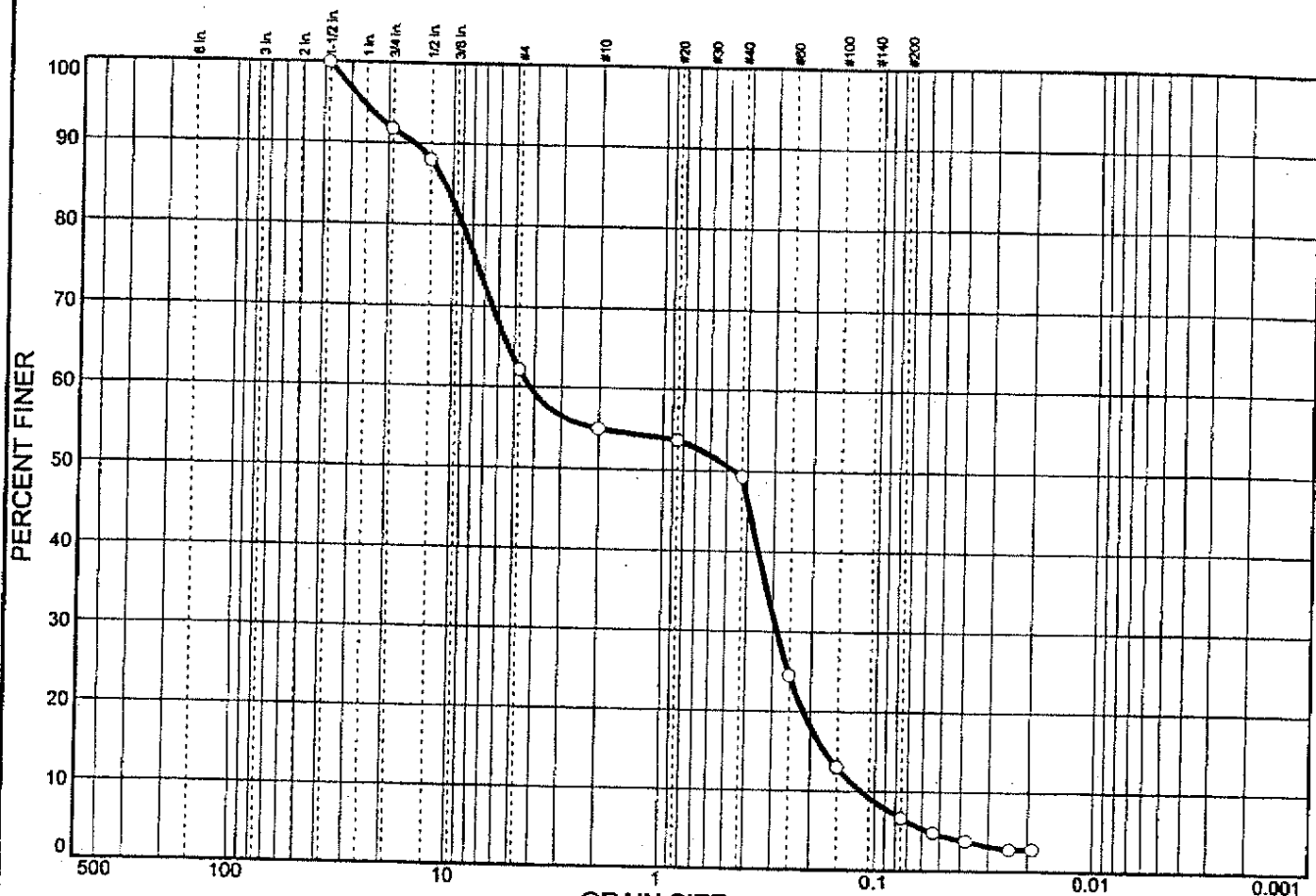
Date: 2/26/01
 Elev./Depth: 9.5-11.5

**A.W. Murfitt
 Company**

Client: U.S. Army Engineer District, Alaska
 Project: Family Housing Upgrade (FTW230)
 Fort Wainwright, Alaska
 Project No: 01-369.08

Plate 43

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	37.8	55.5	6.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.50 in.	100.0		
.75 in.	91.8		
.5 in.	88.0		
#4	62.2		
#10	54.9		
#20	53.7		
#40	49.3		
#60	24.5		
#100	13.0		
#200	6.7		

Soil Description
 Poorly graded sand with silt and gravel.
 2.8% finer than 0.02mm.
 Non Frost Susceptible.

Atterberg Limits
 PL= NP LL= NV PI=

Coefficients
 D₈₅= 10.9 D₆₀= 4.21 D₅₀= 0.462
 D₃₀= 0.287 D₁₅= 0.171 D₁₀= 0.115
 C_u= 36.42 C_c= 0.17

Classification
 USCS= SP-SM AASHTO=

Remarks
 Natural Moisture 3.4%.

* (no specification provided)

Sample No.: 3
 Location:

Source of Sample: AP-26

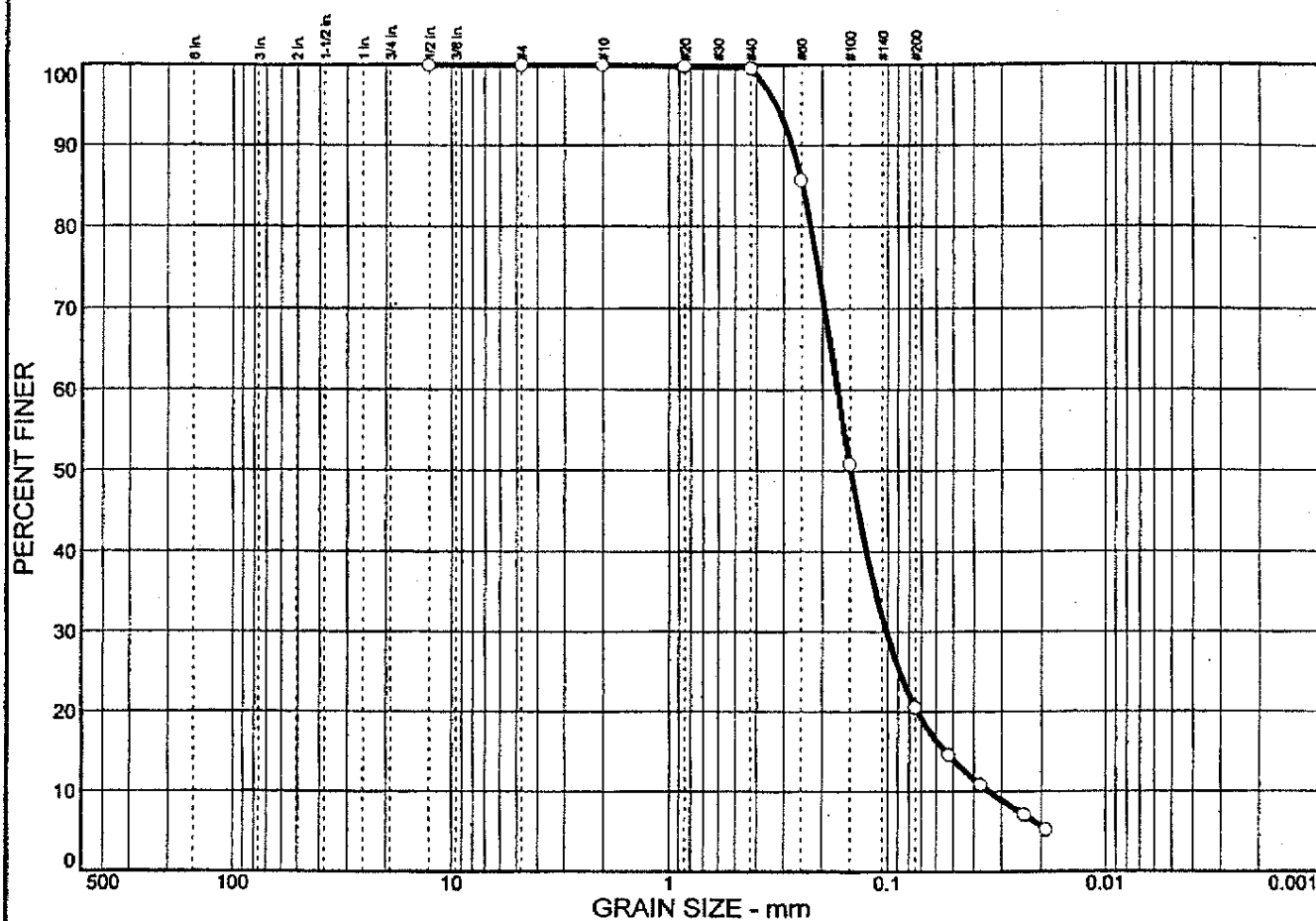
Date: 2/26/01
 Elev./Depth: 9.5-11.5

**A.W. Murfitt
 Company**

Client: U.S. Army Engineer District, Alaska
 Project: Family Housing Upgrade (FTW230)
 Fort Wainwright, Alaska
 Project No: 01-369.08

Plate 44

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	0.0	79.5	20.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.5 in.	100.0		
#4	100.0		
#10	100.0		
#20	99.8		
#40	99.6		
#60	85.7		
#100	50.8		
#200	20.5		

* (no specification provided)

Soil Description

Silty sand.
5.6% finer than 0.075mm.
Possibly Frost Susceptible.

Atterberg Limits

PL= NP

LL= NV

PI=

CoefficientsD₈₅= 0.247D₆₀= 0.171D₅₀= 0.148D₃₀= 0.102D₁₅= 0.0541D₁₀= 0.0344C_u= 4.97C_c= 1.76Classification

USCS= SM

AASHTO=

Remarks

Natural Moisture 5.9%.
Sticks And Organics Present In Sample.

Sample No.: 2

Source of Sample: AP-27

Date: 2/26/01

Location:

Elev./Depth: 4.0-6.0

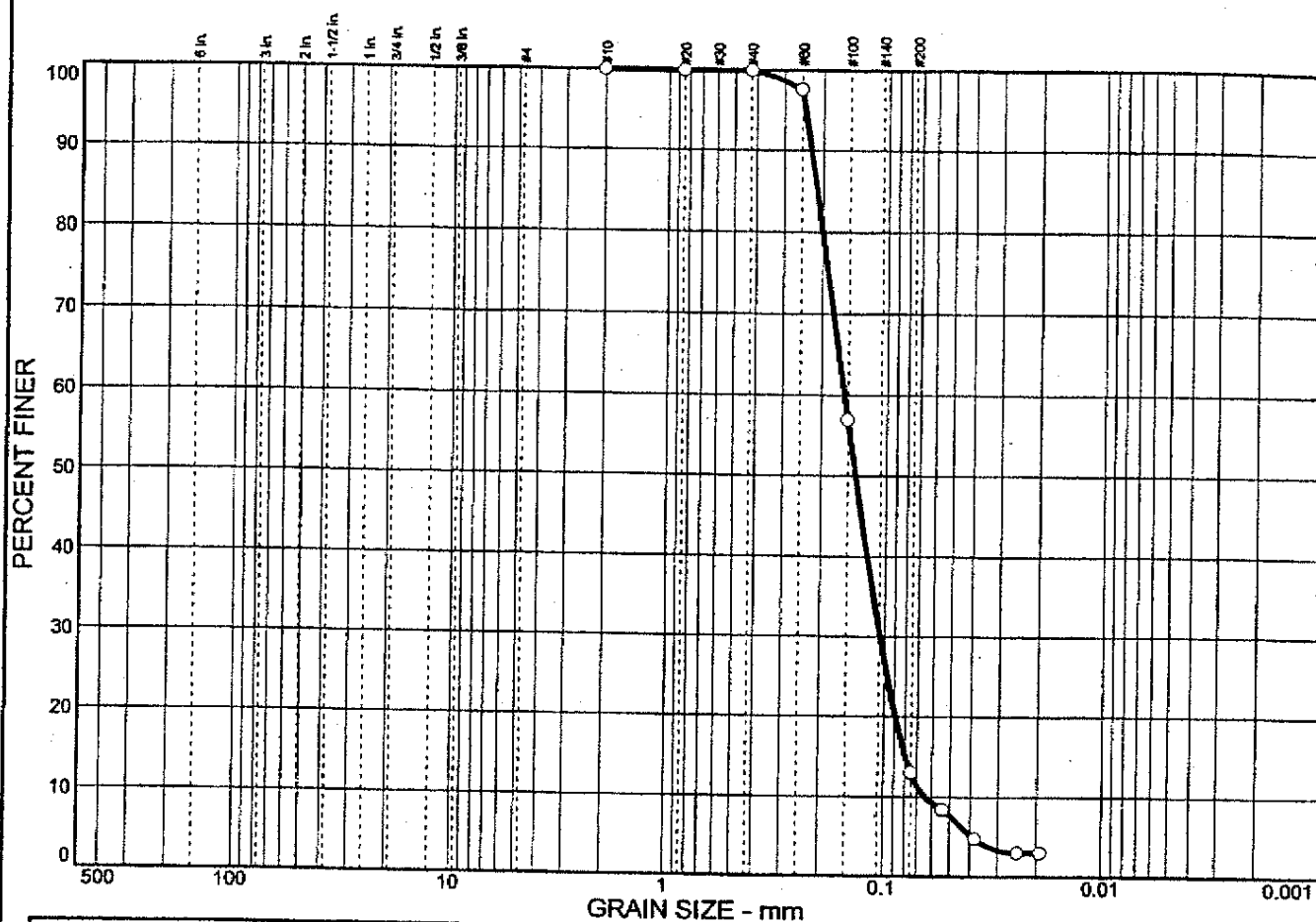
**A.W. Murfitt
Company**

Client: U.S. Army Engineer District, Alaska
Project: Family Housing Upgrade (FTW230)
Fort Wainwright, Alaska

Project No: 01-369.08

Plate 45

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	0.0	87.0	13.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	100.0		
#40	100.0		
#60	97.6		
#100	56.9		
#200	13.0		

* (no specification provided)

Soil Description

Silty sand.
3.0% finer than 0.02mm.
Non Frost Susceptible.

Atterberg Limits

PL= NP LL= NV PI=

Coefficients

D₈₅= 0.213 D₆₀= 0.156 D₅₀= 0.138
D₃₀= 0.105 D₁₅= 0.0797 D₁₀= 0.0642
C_u= 2.43 C_c= 1.11

Classification

USCS= SM AASHTO=

Remarks

Natural Moisture 5.6%.
Depth On Lab Request Form Does Not Match Depth On Bag.

Sample No.: 3
Location:

Source of Sample: AP-27

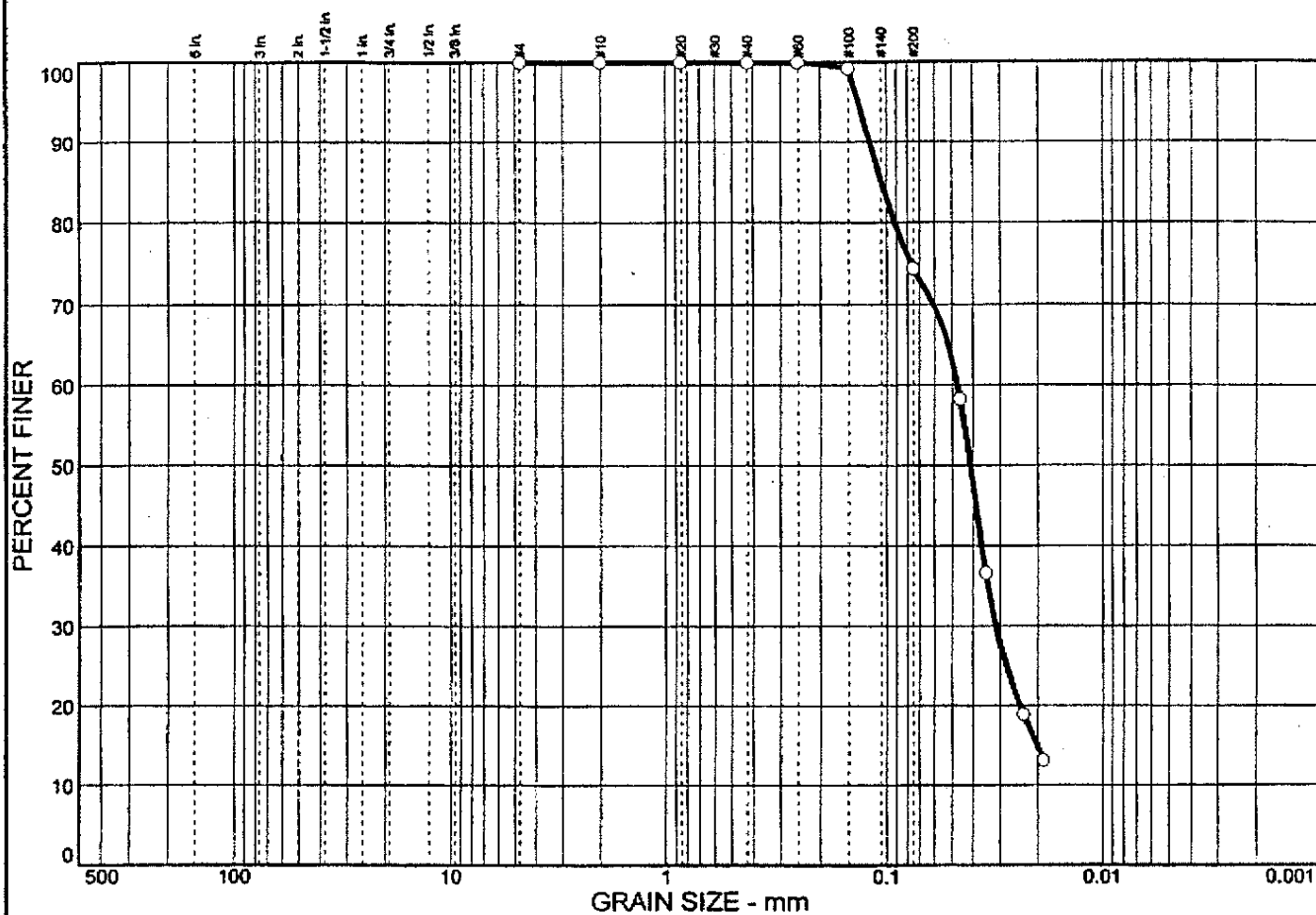
Date: 2/26/01
Elev./Depth: 9.0-11.0

**A.W. Murfitt
Company**

Client: U.S. Army Engineer District, Alaska
Project: Family Housing Upgrade (FTW230)
Fort Wainwright, Alaska
Project No: 01-369.08

Plate 46

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	0.0	25.6	74.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	100.0		
#20	100.0		
#40	100.0		
#60	100.0		
#100	99.2		
#200	74.4		

* (no specification provided)

Soil Description

Silt with sand.
14.7% finer than 0.02mm.
Frost Class F 4.

Atterberg Limits

PL= NP

LL= NV

PI=

Coefficients

D₈₅= 0.106

D₆₀= 0.0472

D₅₀= 0.0412

D₃₀= 0.0314

D₁₅= 0.0202

D₁₀=

C_u=

C_c=

Classification

USCS= ML

AASHTO=

Remarks

Natural Moisture 15.8%.

Sample No.: 2

Source of Sample: AP-28

Date: 2/26/01

Location:

Elev./Depth: 4.0-6.0

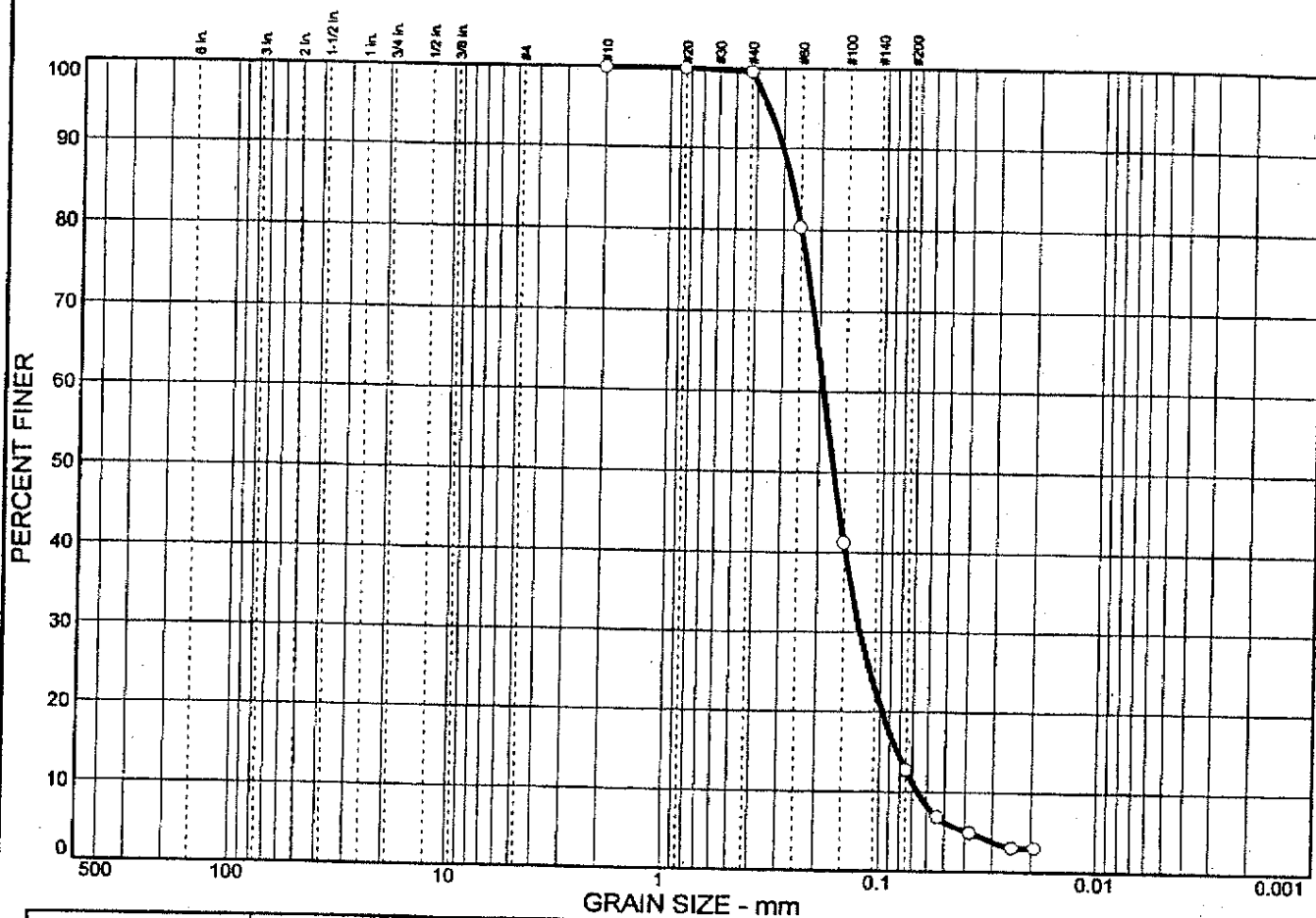
**A.W. Murfitt
Company**

Client: U.S. Army Engineer District, Alaska
Project: Family Housing Upgrade (FTW230)
Fort Wainwright, Alaska

Project No: 01-369.08

Plate 47

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	0.0	87.3	12.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	100.0		
#40	99.6		
#60	80.4		
#100	41.2		
#200	12.7		

* (no specification provided)

Soil Description

Silty sand.
3.1% finer than 0.02mm.
Frost Class S 2.

Atterberg Limits

PL= NP LL= NV PI=

Coefficients

D₈₅= 0.271 D₆₀= 0.191 D₅₀= 0.169
D₃₀= 0.124 D₁₅= 0.0825 D₁₀= 0.0660
C_u= 2.89 C_c= 1.23

Classification

USCS= SM AASHTO=

Remarks

Natural Moisture 6.2%.
Depth On Lab Request Form Does Not Match Depth On Bag.

Sample No.: 3

Location:

Source of Sample: AP-28

Date: 2/26/01

Elev./Depth: 9.0-11.0

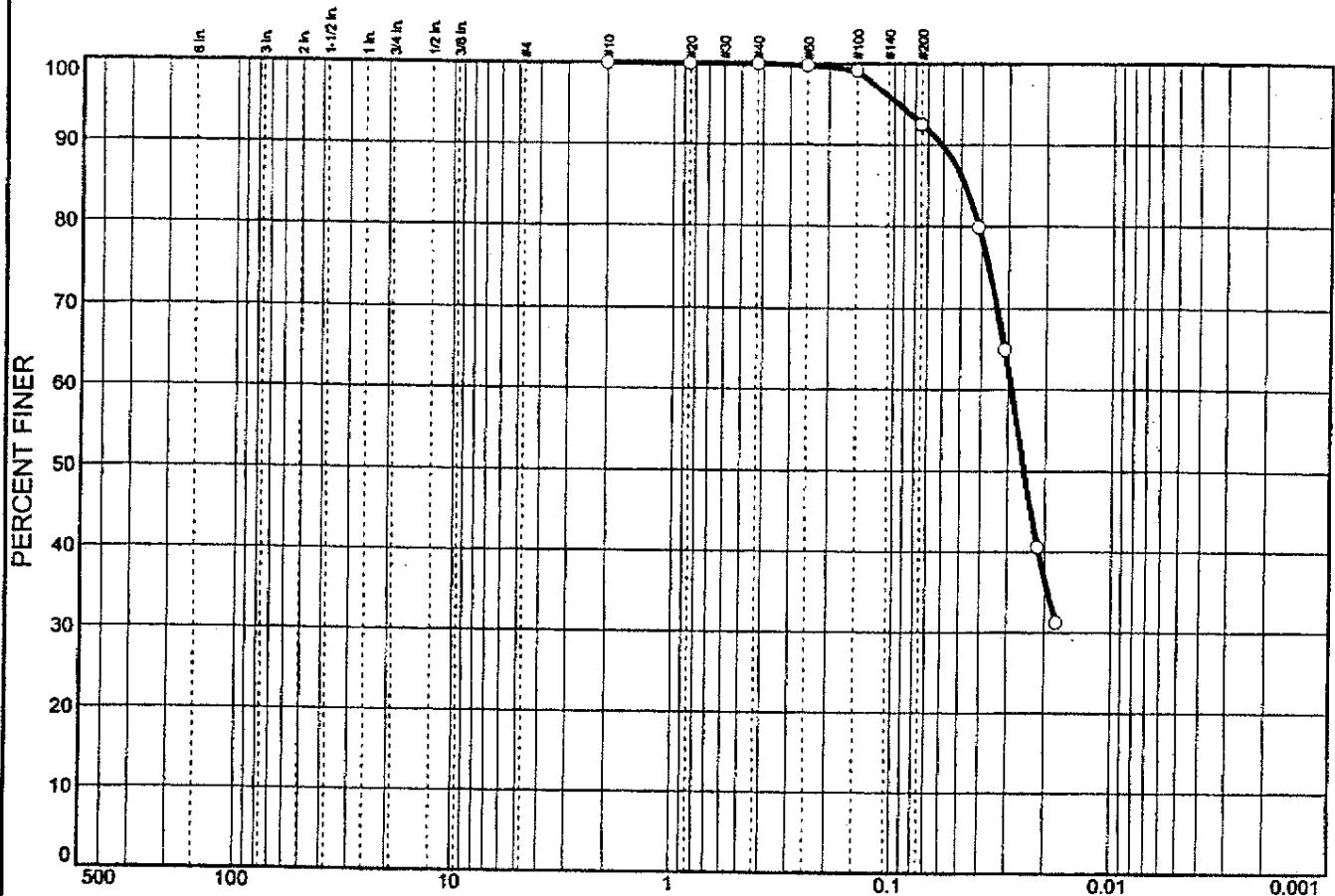
**A.W. Murfitt
Company**

Client: U.S. Army Engineer District, Alaska
Project: Family Housing Upgrade (FTW230)
Fort Wainwright, Alaska

Project No: 01-369.08

Plate 48

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	0.0	7.4	92.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	100.0		
#40	100.0		
#60	99.8		
#100	99.2		
#200	92.6		

* (no specification provided)

Soil Description
 Silt
 36.6% finer than 0.02mm.
 Frost Class F 4.

Atterberg Limits
 PL= NP LL= NV PI=

Coefficients
 D₈₅= 0.0479 D₆₀= 0.0290 D₅₀= 0.0252
 D₃₀= D₁₅= D₁₀=
 C_u= C_c=

Classification
 USCS= ML AASHTO=

Remarks
 Natural Moisture 30.9%.

Sample No.: 2
 Location:

Source of Sample: AP-29

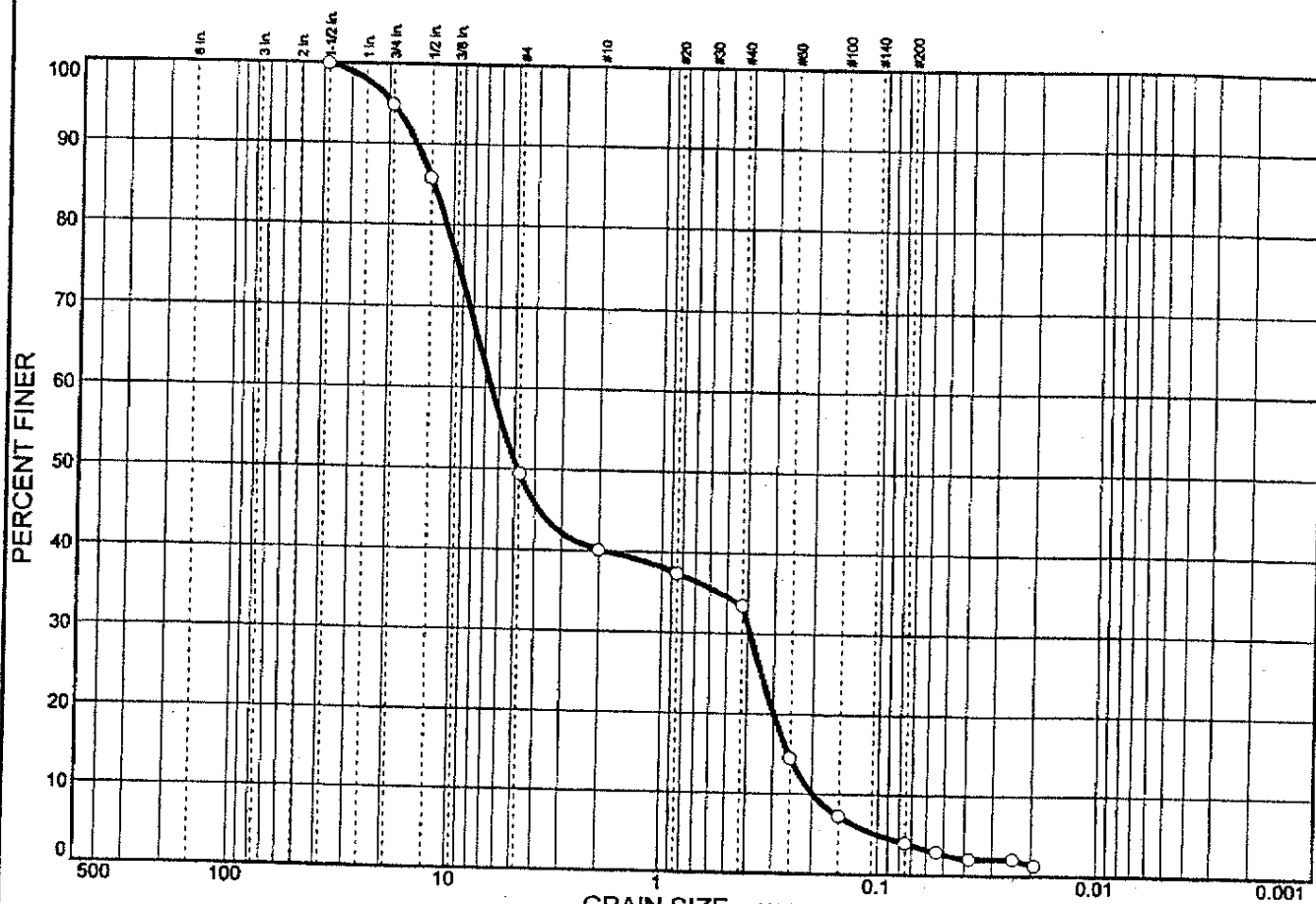
Date: 2/26/01
 Elev./Depth: 4.5-6.5

**A.W. Murfitt
 Company**

Client: U.S. Army Engineer District, Alaska
 Project: Family Housing Upgrade (FTW230)
 Fort Wainwright, Alaska
 Project No: 01-369.08

Plate 49

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	50.6	45.4		4.0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5 in.	100.0		
.75 in.	94.9		
.5 in.	85.8		
#4	49.4		
#10	40.1		
#20	37.4		
#40	33.5		
#60	14.5		
#100	7.3		
#200	4.0		

* (no specification provided)

Soil Description

Poorly graded gravel with sand.

1.4% finer than 0.02mm.

Non Frost Susceptible.

Atterberg Limits

PL= NP

LL= NV

PI=

Coefficients

D₈₅= 12.4

D₆₀= 6.53

D₅₀= 4.86

D₃₀= 0.390

D₁₅= 0.255

D₁₀= 0.197

C_u= 33.05

C_c= 0.12

Classification

USCS= GP

AASHTO=

Remarks

Natural Moisture 1.8%.

Sample No.: 3

Location:

Source of Sample: AP-29

Date: 2/26/01

Elev./Depth: 9.5-11.5

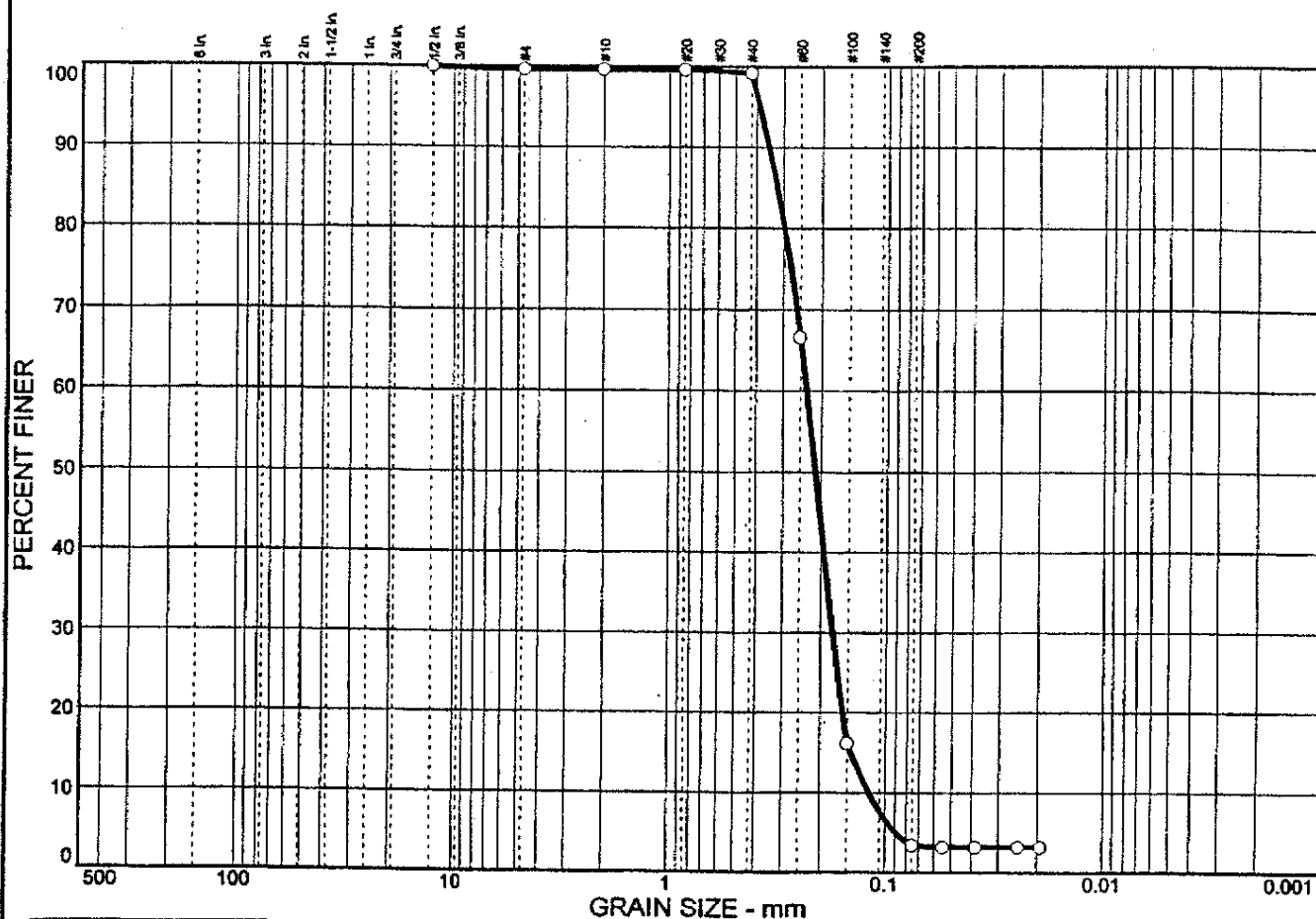
**A.W. Murfitt
Company**

Client: U.S. Army Engineer District, Alaska
Project: Family Housing Upgrade (FTW230)
Fort Wainwright, Alaska

Project No: 01-369.08

Plate 50

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	0.4	96.2	3.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.50 in.	100.0		
#4	99.6		
#10	99.6		
#20	99.6		
#40	99.2		
#60	66.6		
#100	16.2		
#200	3.4		

* (no specification provided)

Soil Description

Poorly graded sand.
3.2% finer than 0.02mm.
Frost Class S 2.

Atterberg Limits

PL= NP LL= NV PI=

Coefficients

D₈₅= 0.321 D₆₀= 0.233 D₅₀= 0.212
D₃₀= 0.176 D₁₅= 0.144 D₁₀= 0.119
C_u= 1.97 C_c= 1.11

Classification

USCS= SP AASHTO=

Remarks

Natural Moisture 27.2%.

Sample No.: 5

Location:

Source of Sample: AP-29

Date: 2/26/01

Elev./Depth: 19.5-21.5

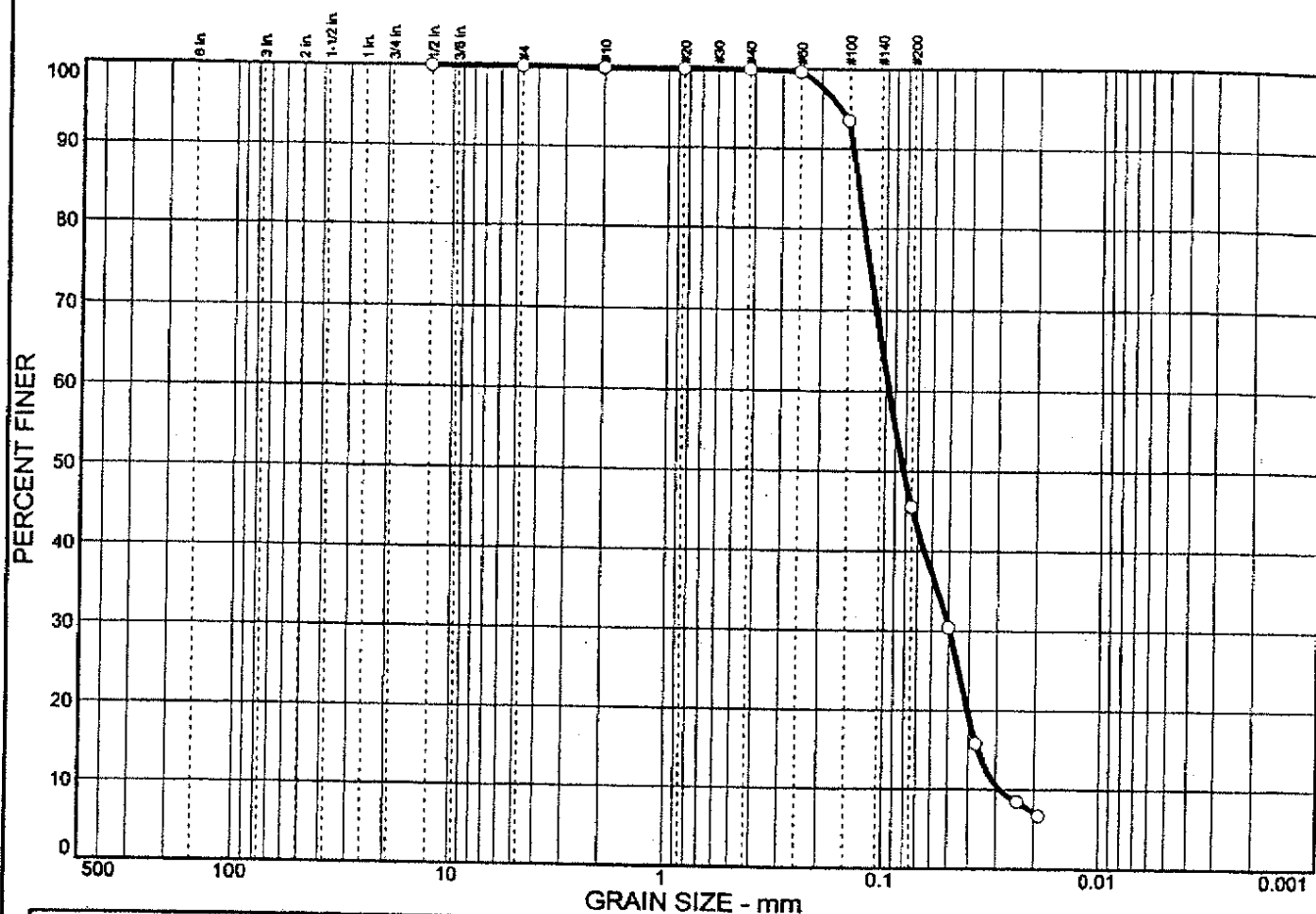
**A.W. Murfitt
Company**

Client: U.S. Army Engineer District, Alaska
Project: Family Housing Upgrade (FTW230)
Fort Wainwright, Alaska

Project No: 01-369.08

Plate 59

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	0.0	54.5	45.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.5 in.	100.0		
#4	100.0		
#10	99.9		
#20	99.9		
#40	99.9		
#60	99.7		
#100	93.6		
#200	45.5		

(no specification provided)

Soil Description

Silty sand.
7.0% finer than 0.02mm.
Frost Class F 2.

Atterberg Limits

PL= NP

LL= NV

PI=

Coefficients

D₈₅= 0.134

D₆₀= 0.0964

D₅₀= 0.0820

D₃₀= 0.0496

D₁₅= 0.0363

D₁₀= 0.0288

C_u= 3.34

C_c= 0.88

Classification

USCS= SM

AASHTO=

Remarks

Natural Moisture 7.0%.

Sample No.: 2

Location:

Source of Sample: AP-30

Date: 2/26/01

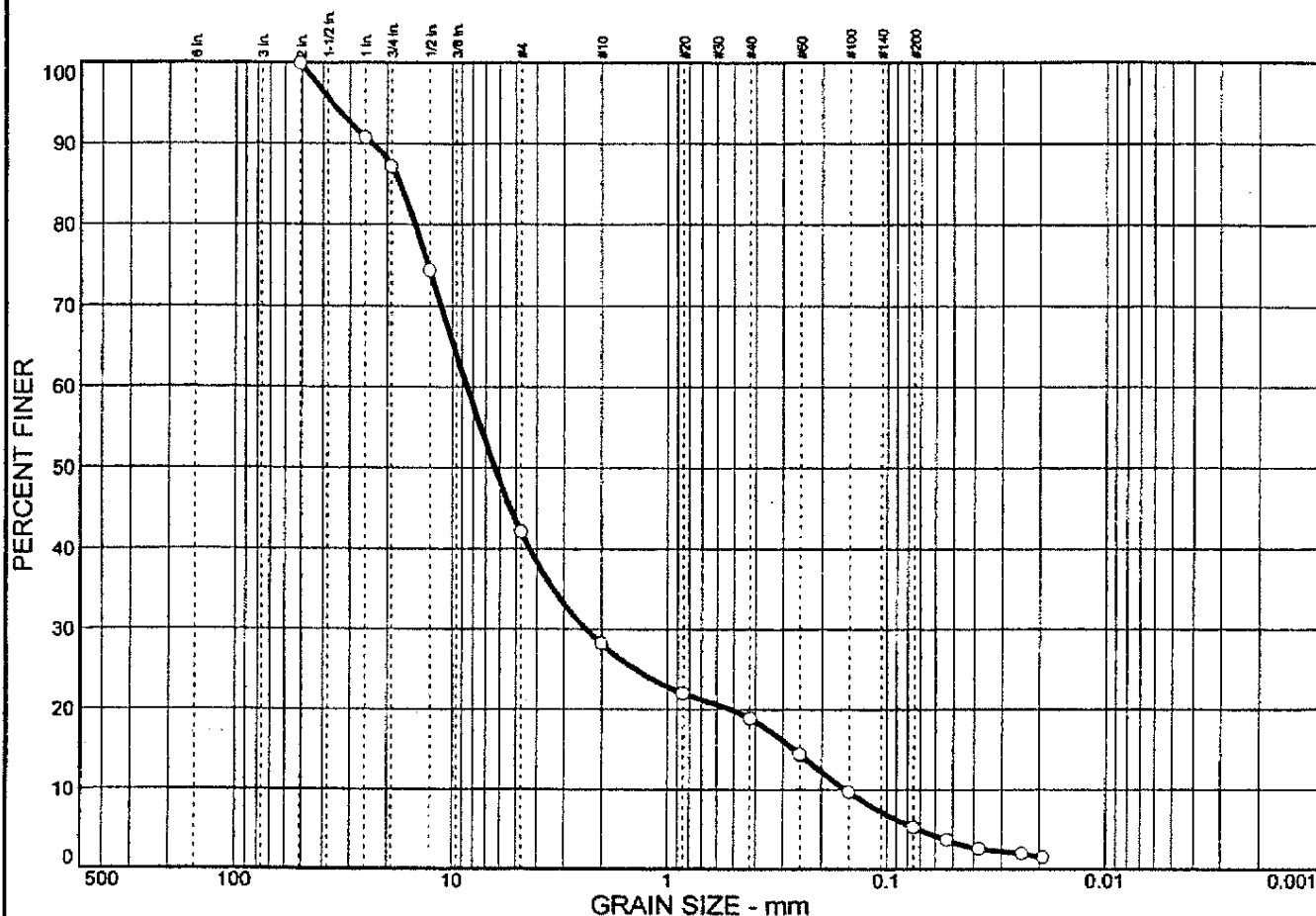
Elev./Depth: 4.5-6.5

**A.W. Murfitt
Company**

Client: U.S. Army Engineer District, Alaska
Project: Family Housing Upgrade (FTW230)
Fort Wainwright, Alaska
Project No: 01-369.08

Plate 51

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	57.9	36.8	5.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
2 in.	100.0		
1 in.	90.8		
.75 in.	87.2		
.5 in.	74.4		
#4	42.1		
#10	28.2		
#20	22.0		
#40	18.9		
#60	14.4		
#100	9.7		
#200	5.3		

* (no specification provided)

Soil Description

Poorly graded gravel with silt and sand.

1.6% finer than 0.075mm.

Possibly Frost Susceptible.

Atterberg Limits

PL= NP

LL= NV

PI=

CoefficientsD₈₅= 17.4D₆₀= 8.55D₅₀= 6.32D₃₀= 2.36D₁₅= 0.266D₁₀= 0.156C_u= 55.00C_c= 4.18Classification

USCS= GP-GM

AASHTO=

Remarks

Natural Moisture 2.0%.

Sample No.: 3

Location:

Source of Sample: AP-30

Date: 2/26/01

Elev./Depth: 9.5-11.5

**A.W. Murfitt
Company**

Client: U.S. Army Engineer District, Alaska
Project: Family Housing Upgrade (FTW230)
Fort Wainwright, Alaska

Project No: 01-369.08

Plate 52

APPENDIX C
CORROSIVITY RESULTS
of
SELECTED SOIL SAMPLES



12189 Pennsylvania Street
Thornton, CO 80241
(303) 469-8868
(800) 873-8707
FAX: (303) 469-5254

2/21/01

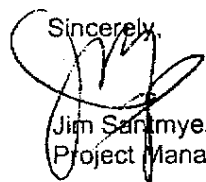
US Army Corps of Engineers
P.O. Box 898
Anchorage, AK 99506-0898
Attn: Jim Robson

Work Order #: B0102082
Date: 2/21/01
Work ID: FTW230 Family Housing Improve
Date Received: 2/9/01

Sample Identification

Lab Sample Number	Client Description	Lab Sample Number	Client Description
B0102082-01	AP3, SA-2 4.5-6.5	B0102082-02	AP9, SA-2 4.5-6.5
B0102082-03	AP13, SA-2 4.0-6.0	B0102082-04	AP18, SA-2 4.5-6.5
B0102082-05	AP21, SA-2 4.5-6.5	B0102082-06	AP26, SA-2 4.5-6.5

Enclosed are the analytical results for the submitted sample(s). Please review the CASE NARRATIVE for a discussion of any data and/or quality control issues. Listings of data qualifiers analytical codes, key dates, and QC relationships are provided at the end of the report.

Sincerely,

Jim Sanmyer
Project Manager

Case Narrative*Analytica Environmental Laboratories, Inc.**Work Order: B0102082*

Samples were prepared and analyzed according to methods outlined in the following references:

- o Methods for the Determination of Inorganic Substances in Environmental Samples, EPA/600/R-93/100, August 1993.
- o Test Methods for Evaluating Solid Waste, USEPA SW-846, Third Edition, Revision 4, December 1996.
- o Standard Method for Laboratory Determination of Water (Moisture) Content of Soil, Rock, and Soil-Aggregate Mixtures, ASTM D 2216-80, July 1980.

Problems encountered with the analyses are discussed in the following narrative.

Detailed Analytical Report

Analytica Environmental Laboratories, Inc.

Workorder (SDG): B0102082

Project: FTW230 Family Housing Improve

Client: U.S. Army Corps of Engineers

Client Project Number: none

Report Section: Client Sample Report

Client Sample Name: AP3, SA-2 4.5-6.5

Matrix: Soil

Collection Date: 1/20/01 12:00:00PM

The following test was conducted by: Analytica - Thornton

Lab Sample Number: B0102082-01A

Prep Date: 2/13/01

Analytical Method ID: pH (SW 9045B)

Prep Method ID: pH9040B

Prep Batch Number: B010213004

Report Basis: Dry Weight Basis

Analysis Date: 2/13/01 9:56:15AM

Instrument: Probe

File Name:

Dilution Factor: 1

Percent Moisture: 9.78

Analyst Initials: AS

Analyte	CASNo	Result	Flags	Units	POL	MDL	Rerun #:
pH		6.9		pH	0.10	0.10	1

The following test was conducted by: Analytica - Thornton

Lab Sample Number: B0102082-01A

Prep Date: 2/14/01

Analytical Method ID: Specific Conductance (SW 9050)

Prep Method ID: 9050_S

Prep Batch Number: B010216001

Report Basis: Dry Weight Basis

Analysis Date: 2/15/01 9:00:03AM

Instrument: Probe

File Name:

Dilution Factor: 1

Percent Moisture: 9.78

Analyst Initials: SBP

Analyte	CASNo	Result	Flags	Units	POL	MDL	Rerun #:
Conductance		110		umhos/cm	5.0	1.0	1

The following test was conducted by: Analytica - Thornton

Lab Sample Number: B0102082-01A

Prep Date: 2/14/01

Analytical Method ID: Sulfide, Total (EPA 376.1)

Prep Method ID: 376.1M

Prep Batch Number: B010220008

Report Basis: Dry Weight Basis

Analysis Date: 2/15/01 12:03:49PM

Instrument: Titrametric

File Name:

Dilution Factor: 1

Percent Moisture: 9.78

Analyst Initials: SBP

Analyte	CASNo	Result	Flags	Units	POL	MDL	Rerun #:
Sulfide, Total		ND		mg/Kg	2.8	0.55	1

The following test was conducted by: Analytica - Thornton

Lab Sample Number: B0102082-01A

Prep Date: 2/14/01

Analytical Method ID: Anions by IC (EPA 300.0 M)

Prep Method ID: 300.0

Prep Batch Number: B010216003

Report Basis: Dry Weight Basis

Analysis Date: 2/15/01 12:17:37PM

Instrument: IC

File Name: 010215_007.DXD

Dilution Factor: 1

Percent Moisture: 9.78

Analyst Initials: SBP

Analyte	CASNo	Result	Flags	Units	POL	MDL	Rerun #:
Chloride		0.68		mg/kg	0.22	0.038	1
Sulfate		12		mg/kg	0.55	0.17	

Detailed Analytical Report

Analytica Environmental Laboratories, Inc.

Workorder (SDG): B0102082

Project: FTW230 Family Housing Improve

Client: U.S. Army Corps of Engineers

Client Project Number: none

Report Section: Client Sample Report

Client Sample Name: AP9, SA-2 4.5-6.5

Matrix: Soil

Collection Date: 1/23/01 12:00:00PM

The following test was conducted by: Analytica - Thornton

Lab Sample Number: B0102082-02A

Prep Date: 2/13/01

Analytical Method ID: pH (SW 9045B)

Prep Method ID: pH9040B

Prep Batch Number: B010213004

Report Basis: Dry Weight Basis

Analysis Date: 2/13/01 9:56:15AM

Instrument: Probe

File Name:

Dilution Factor: 1

Percent Moisture: 13

Analyst Initials: AS

Analyte	CASNo	Result	Flags	Units	PQL	MDL	Rerun #:
pH		7.1		pH	0.10	0.10	1

The following test was conducted by: Analytica - Thornton

Lab Sample Number: B0102082-02A

Prep Date: 2/14/01

Analytical Method ID: Specific Conductance (SW 9050)

Prep Method ID: 9050_S

Prep Batch Number: B010216001

Report Basis: Dry Weight Basis

Analysis Date: 2/15/01 9:00:03AM

Instrument: Probe

File Name:

Dilution Factor: 1

Percent Moisture: 13

Analyst Initials: SBP

Analyte	CASNo	Result	Flags	Units	PQL	MDL	Rerun #:
Conductance		390		umhos/cm 5.0	1.0		1

The following test was conducted by: Analytica - Thornton

Lab Sample Number: B0102082-02A

Prep Date: 2/14/01

Analytical Method ID: Sulfide, Total (EPA 376.1)

Prep Method ID: 376.1M

Prep Batch Number: B010220008

Report Basis: Dry Weight Basis

Analysis Date: 2/15/01 12:03:49PM

Instrument: Titrametric

File Name:

Dilution Factor: 1

Percent Moisture: 13

Analyst Initials: SBP

Analyte	CASNo	Result	Flags	Units	PQL	MDL	Rerun #:
Sulfide, Total		ND		mg/Kg	2.9	0.58	1

The following test was conducted by: Analytica - Thornton

Lab Sample Number: B0102082-02A

Prep Date: 2/14/01

Analytical Method ID: Anions by IC (EPA 300.0 M)

Prep Method ID: 300.0

Prep Batch Number: B010216003

Report Basis: Dry Weight Basis

Analysis Date: 2/15/01 1:06:45PM

Instrument: IC

File Name: 010215_010.DXD

Dilution Factor: 1

Percent Moisture: 13

Analyst Initials: SBP

Analyte	CASNo	Result	Flags	Units	PQL	MDL	Rerun #:
Chloride		2.9		mg/kg	0.23	0.039	1
Sulfate		44		mg/kg	0.58	0.18	

Detailed Analytical Report

Analytica Environmental Laboratories, Inc.

Workorder (SDG): B0102082

Project: FTW230 Family Housing Improve

Client: U.S. Army Corps of Engineers

Client Project Number: none

Report Section: Client Sample Report

Client Sample Name: AP13, SA-2 4.0-6.0

Matrix: Soil

Collection Date: 1/25/01 12:00:00PM

The following test was conducted by: Analytica - Thornton

Lab Sample Number: B0102082-03A

Prep Date: 2/13/01

Analytical Method ID: pH (SW 9045B)

Prep Method ID: pH9040B

Prep Batch Number: B010213004

Report Basis: Dry Weight Basis

Analysis Date: 2/13/01 9:56:15AM

Instrument: Probe

File Name:

Dilution Factor: 1

Percent Moisture: 4.87

Analyst Initials: AS

Analyte	CASNo	Result	Flags	Units	PQL	MDL	Rerun #:
pH		7.3		pH	0.10	0.10	1

The following test was conducted by: Analytica - Thornton

Lab Sample Number: B0102082-03A

Prep Date: 2/14/01

Analytical Method ID: Specific Conductance (SW 9050)

Prep Method ID: 9050_S

Prep Batch Number: B010216001

Report Basis: Dry Weight Basis

Analysis Date: 2/15/01 9:00:03AM

Instrument: Probe

File Name:

Dilution Factor: 1

Percent Moisture: 4.87

Analyst Initials: SBP

Analyte	CASNo	Result	Flags	Units	PQL	MDL	Rerun #:
Conductance		120		umhos/cm	5.0	1.0	1

The following test was conducted by: Analytica - Thornton

Lab Sample Number: B0102082-03A

Prep Date: 2/14/01

Analytical Method ID: Sulfide, Total (EPA 376.1)

Prep Method ID: 376.1M

Prep Batch Number: B010220008

Report Basis: Dry Weight Basis

Analysis Date: 2/15/01 12:03:49PM

Instrument: Titrametric

File Name:

Dilution Factor: 1

Percent Moisture: 4.87

Analyst Initials: SBP

Analyte	CASNo	Result	Flags	Units	PQL	MDL	Rerun #:
Sulfide, Total		ND		mg/Kg	2.6	0.53	1

The following test was conducted by: Analytica - Thornton

Lab Sample Number: B0102082-03A

Prep Date: 2/14/01

Analytical Method ID: Anions by IC (EPA 300.0 M)

Prep Method ID: 300.0

Prep Batch Number: B010216003

Report Basis: Dry Weight Basis

Analysis Date: 2/15/01 1:23:05PM

Instrument: IC

File Name: 010215_011.DXD

Dilution Factor: 1

Percent Moisture: 4.87

Analyst Initials: SBP

Analyte	CASNo	Result	Flags	Units	PQL	MDL	Rerun #:
Chloride		0.24		mg/kg	0.21	0.036	1
Sulfate		6.5		mg/kg	0.53	0.16	

Detailed Analytical Report

Analytica Environmental Laboratories, Inc.

Workorder (SDG): B0102082

Project: FTW230 Family Housing Improve

Client: U.S. Army Corps of Engineers

Client Project Number: none

Report Section: Client Sample ReportClient Sample Name: **API8, SA-2 4.5-6.5**

Matrix: Soil

Collection Date: 1/26/01 12:00:00PM

The following test was conducted by: Analytica - Thornton

Lab Sample Number: B0102082-04A

Prep Date: 2/13/01

Analytical Method ID: pH (SW 9045B)

Prep Method ID: pH9040B

Prep Batch Number: B010213004

Report Basis: Dry Weight Basis

Analysis Date: 2/13/01 9:56:15AM

Instrument: Probe

File Name:

Dilution Factor: 1

Percent Moisture: 7.96

Analyst Initials: AS

Analyte	CASNo	Result	Flags	Units	PQL	MDL	Rerun #:
pH		7.0		pH	0.10	0.10	1

The following test was conducted by: Analytica - Thornton

Lab Sample Number: B0102082-04A

Prep Date: 2/14/01

Analytical Method ID: Specific Conductance (SW 9050)

Prep Method ID: 9050_S

Prep Batch Number: B010216001

Report Basis: Dry Weight Basis

Analysis Date: 2/15/01 9:00:03AM

Instrument: Probe

File Name:

Dilution Factor: 1

Percent Moisture: 7.96

Analyst Initials: SBP

Analyte	CASNo	Result	Flags	Units	PQL	MDL	Rerun #:
Conductance		140		umhos/cm 5.0		1.0	1

The following test was conducted by: Analytica - Thornton

Lab Sample Number: B0102082-04A

Prep Date: 2/14/01

Analytical Method ID: Sulfide, Total (EPA 376.1)

Prep Method ID: 376.1M

Prep Batch Number: B010220008

Report Basis: Dry Weight Basis

Analysis Date: 2/15/01 12:03:49PM

Instrument: Titrametric

File Name:

Dilution Factor: 1

Percent Moisture: 7.96

Analyst Initials: SBP

Analyte	CASNo	Result	Flags	Units	PQL	MDL	Rerun #:
Sulfide, Total		ND		mg/Kg	2.7	0.54	1

The following test was conducted by: Analytica - Thornton

Lab Sample Number: B0102082-04A

Prep Date: 2/14/01

Analytical Method ID: Anions by IC (EPA 300.0 M)

Prep Method ID: 300.0

Prep Batch Number: B010216003

Report Basis: Dry Weight Basis

Analysis Date: 2/15/01 1:39:27PM

Instrument: IC

File Name: 010215_012.DXD

Dilution Factor: 1

Percent Moisture: 7.96

Analyst Initials: SBP

Analyte	CASNo	Result	Flags	Units	PQL	MDL	Rerun #:
Chloride		0.83		mg/kg	0.22	0.037	1
Sulfate		6.6		mg/kg	0.54	0.17	

Detailed Analytical Report

Analytica Environmental Laboratories, Inc.

Workorder (SDG): B0102082

Project: FTW230 Family Housing Improve

Client: U.S. Army Corps of Engineers

Client Project Number: none

Report Section: Client Sample ReportClient Sample Name: **AP21, SA-2 4.5-6.5**

Matrix: Soil

Collection Date: 1/27/01 12:00:00PM

The following test was conducted by: Analytica - Thornton

Lab Sample Number: B0102082-05A

Prep Date: 2/13/01

Analytical Method ID: pH (SW 9045B)

Prep Method ID: pH9040B

Prep Batch Number: B010213004

Report Basis: Dry Weight Basis

Analysis Date: 2/13/01 9:56:15AM

Instrument: Probe

File Name:

Dilution Factor: 1

Percent Moisture 17

Analyst Initials: AS

Analyte	CASNo	Result	Flags	Units	PQL	MDL	Rerun #:
pH		6.8		pH	0.10	0.10	1

The following test was conducted by: Analytica - Thornton

Lab Sample Number: B0102082-05A

Prep Date: 2/14/01

Analytical Method ID: Specific Conductance (SW 9050)

Prep Method ID: 9050_S

Prep Batch Number: B010216001

Report Basis: Dry Weight Basis

Analysis Date: 2/15/01 9:00:03AM

Instrument: Probe

File Name:

Dilution Factor: 1

Percent Moisture 17

Analyst Initials: SBP

Analyte	CASNo	Result	Flags	Units	PQL	MDL	Rerun #:
Conductance		240		umhos/cm	5.0	1.0	1

The following test was conducted by: Analytica - Thornton

Lab Sample Number: B0102082-05A

Prep Date: 2/14/01

Analytical Method ID: Sulfide, Total (EPA 376.1)

Prep Method ID: 376.1M

Prep Batch Number: B010220008

Report Basis: Dry Weight Basis

Analysis Date: 2/15/01 12:03:49PM

Instrument: Titrametric

File Name:

Dilution Factor: 1

Percent Moisture 17

Analyst Initials: SBP

Analyte	CASNo	Result	Flags	Units	PQL	MDL	Rerun #:
Sulfide, Total		ND		mg/Kg	3.0	0.60	1

The following test was conducted by: Analytica - Thornton

Lab Sample Number: B0102082-05A

Prep Date: 2/14/01

Analytical Method ID: Anions by IC (EPA 300.0 M)

Prep Method ID: 300.0

Prep Batch Number: B010216003

Report Basis: Dry Weight Basis

Analysis Date: 2/15/01 2:28:36PM

Instrument: IC

File Name: 010215_015.DXD

Dilution Factor: 1

Percent Moisture 17

Analyst Initials: SBP

Analyte	CASNo	Result	Flags	Units	PQL	MDL	Rerun #:
Chloride		0.98		mg/kg	0.24	0.041	1
Sulfate		21		mg/kg	0.60	0.19	

Detailed Analytical Report

Case 3:05-cv-00263-JKS

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Analytica Environmental Laboratories, Inc.

Workorder (SDG): B0102082

Project: FTW230 Family Housing Improve

Client: U.S. Army Corps of Engineers

Client Project Number: none

Report Section: Client Sample Report

Client Sample Name: AP26, SA-2 4.5-6.5

Matrix: Soil

Collection Date: 1/29/01 12:00:00PM

The following test was conducted by: Analytica - Thornton

Lab Sample Number: B0102082-06A

Prep Date: 2/13/01

Analytical Method ID: pH (SW 9045B)

Prep Method ID: pH9040B

Prep Batch Number: B010213004

Report Basis: Dry Weight Basis

Analysis Date: 2/13/01 9:56:15AM

Instrument: Probe

File Name:

Dilution Factor: 1

Percent Moisture: 6.92

Analyst Initials: AS

Analyte	CASNo	Result	Flags	Units	PQL	MDL	Rerun #:
pH		7.2		pH	0.10	0.10	1

The following test was conducted by: Analytica - Thornton

Lab Sample Number: B0102082-06A

Prep Date: 2/14/01

Analytical Method ID: Specific Conductance (SW 9050)

Prep Method ID: 9050_S

Prep Batch Number: B010216001

Report Basis: Dry Weight Basis

Analysis Date: 2/15/01 9:00:03AM

Instrument: Probe

File Name:

Dilution Factor: 1

Percent Moisture: 6.92

Analyst Initials: SBP

Analyte	CASNo	Result	Flags	Units	PQL	MDL	Rerun #:
Conductance		130		umhos/cm	5.0	1.0	1

The following test was conducted by: Analytica - Thornton

Lab Sample Number: B0102082-06A

Prep Date: 2/14/01

Analytical Method ID: Sulfide, Total (EPA 376.1)

Prep Method ID: 376.1M

Prep Batch Number: B010220008

Report Basis: Dry Weight Basis

Analysis Date: 2/15/01 12:03:49PM

Instrument: Titrametric

File Name:

Dilution Factor: 1

Percent Moisture: 6.92

Analyst Initials: SBP

Analyte	CASNo	Result	Flags	Units	PQL	MDL	Rerun #:
Sulfide, Total		ND		mg/Kg	2.7	0.54	1

The following test was conducted by: Analytica - Thornton

Lab Sample Number: B0102082-06A

Prep Date: 2/14/01

Analytical Method ID: Anions by IC (EPA 300.0 M)

Prep Method ID: 300.0

Prep Batch Number: B010216003

Report Basis: Dry Weight Basis

Analysis Date: 2/15/01 2:44:58PM

Instrument: IC

File Name: 010215_016.DXD

Dilution Factor: 1

Percent Moisture: 6.92

Analyst Initials: SBP

Analyte	CASNo	Result	Flags	Units	PQL	MDL	Rerun #:
Chloride		0.39		mg/kg	0.21	0.037	1
Sulfate		9.6		mg/kg	0.54	0.17	

Detailed Analytical Report

Analytica Environmental Laboratories, Inc.

Workorder (SDG): B0102082

Project: FTW230 Family Housing Improve

Client: U.S. Army Corps of Engineers

Client Project Number: none

Report Section: Method Blank Report

Client Sample Name:

MB

Matrix: Aqueous

Collection Date: 2/13/01 12:00:00AM

The following test was conducted by: Analytica - Thornton

Lab Sample Number: B010213004-MB

Prep Date: 2/13/01

Analytical Method ID: pH (SW 9045B)

Prep Method ID: pH9040B

Prep Batch Number: B010213004

Report Basis: Dry Weight Basis

Analysis Date: 2/13/01 9:56:15AM

Instrument: Probe

File Name:

Dilution Factor: 1

Analyst Initials: AS

Analyte	CASNo	Result	Flags	Units	PQL	MDL	Rerun #:
pH		ND		pH	0.10	0.10	1

The following test was conducted by: Analytica - Thornton

Lab Sample Number: B010216001-MB

Prep Date: 2/14/01

Analytical Method ID: Specific Conductance (SW 9050)

Prep Method ID: 9050_S

Prep Batch Number: B010216001

Report Basis: Dry Weight Basis

Analysis Date: 2/15/01 9:00:03AM

Instrument: Probe

File Name:

Dilution Factor: 1

Analyst Initials: SBP

Analyte	CASNo	Result	Flags	Units	PQL	MDL	Rerun #:
Conductance		ND		umhos/cm	5.0	1.0	1

The following test was conducted by: Analytica - Thornton

Lab Sample Number: B010220008-MB

Prep Date: 2/14/01

Analytical Method ID: Sulfide, Total (EPA 376.1)

Prep Method ID: 376.1M

Prep Batch Number: B010220008

Report Basis: Dry Weight Basis

Analysis Date: 2/15/01 12:03:49PM

Instrument: Titrametric

File Name:

Dilution Factor: 1

Analyst Initials: SBP

Analyte	CASNo	Result	Flags	Units	PQL	MDL	Rerun #:
Sulfide, Total		ND		mg/Kg	2.5	0.50	1

The following test was conducted by: Analytica - Thornton

Lab Sample Number: B010216003-MB

Prep Date: 2/14/01

Analytical Method ID: Anions by IC (EPA 300.0 M)

Prep Method ID: 300.0

Prep Batch Number: B010216003

Report Basis: Dry Weight Basis

Analysis Date: 2/15/01 11:44:54AM

Instrument: IC

File Name: 010215_005.DXD

Dilution Factor: 1

Analyst Initials: SBP

Analyte	CASNo	Result	Flags	Units	PQL	MDL	Rerun #:
Chloride		ND		mg/kg	0.20	0.034	1
Sulfate		ND		mg/kg	0.50	0.16	

Detailed Analytical Report

Workorder (SDG): B0102082

Analytica Environmental Laboratories, Inc.

Project: FTW230 Family Housing Improve
Client: U.S. Army Corps of Engineers
Client Project Number: none

QC Recovery Report

Work Order: B0102082

Prep Batch Number: B010213004

Base Sample	B010213004-MB			Anal. Method:	pH (SW 9045B)			
QC Sample	B010213004-LCS			Sample Prep Date:	2/13/01 12:00:00AM			
Sample Analysis Date:	2/13/01 9:56:15AM			Analysis Units:	pH			
QC Sample Analysis Date:	2/13/01 9:56:15AM			Matrix:	Aqueous			
Analyte	Samp. Result	Spike Res.	Spike Conc	Recov	LCL	UCL	RPD	Rec FI
pH	ND	7.42	7.40	100	80	120		

Prep Batch Number: B010216001

Base Sample	B010216001-MB			Anal. Method:	Specific Conductance (SW 9050)			
QC Sample	B010216001-LCS			Sample Prep Date:	2/14/01 12:00:00AM			
Sample Analysis Date:	2/15/01 9:00:03AM			Analysis Units:	umhos/cm			
QC Sample Analysis Date:	2/15/01 9:00:03AM			Matrix:	Soil			
Analyte	Samp. Result	Spike Res.	Spike Conc	QC DUP Sample Analysis Date:				
				Recov	LCL	UCL	RPD	Rec FI
Conductance	ND	448	447	100	80	120		

Prep Batch Number: B010216003

Base Sample	B010216003-MB			Anal. Method:	Anions by IC (EPA 300.0 M)			
QC Sample	B010216003-LCS			Sample Prep Date:	2/14/01 12:00:00AM			
Sample Analysis Date:	2/15/01 11:44:54AM			Analysis Units:	mg/kg			
QC Sample Analysis Date:	2/15/01 12:01:14PM			Matrix:	Aqueous			
Analyte	Samp. Result	Spike Res.	Spike Conc	Recov	LCL	UCL	RPD	Rec FI
Chloride	ND	5.31	5.00	106				
Sulfate	ND	38.8	37.5	103	80	120		
					80	120		

Prep Batch Number: B010220008

Base Sample	B010220008-MB	Anal. Method:	Sulfide, Total (EPA 376.1)
QC Sample	B010220008-LCS	Sample Prep Date:	2/14/01 12:00:00AM
Sample Analysis Date:	2/15/01 12:03:49PM	Analysis Units:	mg/Kg
QC Sample Analysis Date:	2/15/01 12:03:49PM	Matrix:	Soil
		QC DUP Sample Analysis Date:	

Detailed Analytical Report

Analytica Environmental Laboratories, Inc.

Workorder (SDG): B0102082

Project: FTW230 Family Housing Improve

Client: U.S. Army Corps of Engineers

Client Project Number: none

QC Recovery Report

Work Order: B0102082

Prep Batch Number: B010220008

Base Sample	B010220008-MB			Anal. Method:	Sulfide, Total (EPA 376.1)			
QC Sample	B010220008-LCS			Sample Prep Date:	2/14/01 12:00:00AM			
				Analysis Units:	mg/Kg			
Sample Analysis Date:	2/15/01 12:03:49PM			Matrix:	Soil			
QC Sample Analysis Date:	2/15/01 12:03:49PM			QC DUP Sample Analysis Date:				
Analyte	Samp. Result	Spike Res.	Spike Conc	Recov	LCL	UCL	RPD	Rec Fl
Sulfide, Total	ND	16.4	20.0	82	80	120		

FOOTNOTES TO QC REPORT

Note 1: Results are shown to three significant figures to avoid rounding errors in calculations.

Note 2: If the sample concentration is greater than 4 times the spike level, a recovery is not calculated, and the result should be used as a replicate. In such cases the spike is not as high as expected random measurement variability of the sample result itself.

Note 3: For sample duplicates, if the result is less than the PQL, the duplicate RPD is not applicable and is shown as 0. If the sample and duplicate results are not five times the PQL or greater, then the RPD is not expected to fall within the window shown and the comparison should be made on the basis of the absolute difference. Analytica uses the criterion that the absolute difference should be less than the PQL for water or less than 2XPQL for other matrices.

Detailed Analytical Report

Analytica Environmental Laboratories, Inc.

Workorder (SDG): B0102082

Project: FTW230 Family Housing Improve

Client: U.S. Army Corps of Engineers

Client Project Number: none

QC BATCH ASSOCIATIONS - BY METHOD BLANK

Lab Project ID:	2,110	Lab Project Number:	B0102082
Test:	pH (SW 9045B)	Prep Date: 2/13/01	
Lab Method Blank Id:	B010213004-MB		
Prep Batch ID:	B010213004		
Method:	pH (SW 9045B)		
This Method blank and sample preparation batch are associated with the following samples, spikes, and duplicates:			
<u>SampleNum</u>	<u>ClientSampleName</u>	<u>DataFile</u>	<u>AnalysisDate</u>
B0102056-02A	Batch QC		2/13/01 9:56:15AM
B0102082-01A	AP3, SA-2 4.5-6.5		2/13/01 9:56:15AM
B0102082-02A	AP9, SA-2 4.5-6.5		2/13/01 9:56:15AM
B0102082-03A	AP13, SA-2 4.0-6.0		2/13/01 9:56:15AM
B0102082-04A	AP18, SA-2 4.5-6.5		2/13/01 9:56:15AM
B0102082-05A	AP21, SA-2 4.5-6.5		2/13/01 9:56:15AM
B0102082-06A	AP26, SA-2 4.5-6.5		2/13/01 9:56:15AM
B010213004-LCS	LCS		2/13/01 9:56:15AM
B0102056-02A-DUP	DUP		2/13/01 9:56:15AM
B0102082-01A-DUP	DUP		2/13/01 9:56:15AM

Test:	Percent Moisture (ASTM D2216)	Prep Date: 2/14/01
Lab Method Blank Id:	B010215002-MB	
Prep Batch ID:	B010215002	
Method:	Percent Moisture (ASTM D2216)	
This Method blank and sample preparation batch are associated with the following samples, spikes, and duplicates:		
<u>SampleNum</u>	<u>ClientSampleName</u>	<u>DataFile</u>
B0102082-01A	AP3, SA-2 4.5-6.5	2/15/01 8:15:14AM
B0102082-02A	AP9, SA-2 4.5-6.5	2/15/01 8:15:14AM
B0102082-03A	AP13, SA-2 4.0-6.0	2/15/01 8:15:14AM
B0102082-04A	AP18, SA-2 4.5-6.5	2/15/01 8:15:14AM
B0102082-05A	AP21, SA-2 4.5-6.5	2/15/01 8:15:14AM
B0102082-06A	AP26, SA-2 4.5-6.5	2/15/01 8:15:14AM
B0102082-06A-DUP	DUP	2/15/01 8:15:14AM

Detailed Analytical Report

Analytica Environmental Laboratories, Inc.

Workorder (SDG): B0102082

Project: FTW230 Family Housing Improve

Client: U.S. Army Corps of Engineers

Client Project Number: none

QC BATCH ASSOCIATIONS - BY METHOD BLANK

Lab Project ID: 2,110 Lab Project Number: B0102082

Test: Specific Conductance (SW 9050) Prep Date: 2/14/01

Lab Method Blank Id: B010216001-MB

Prep Batch ID: B010216001

Method: Specific Conductance (SW 9050)

This Method blank and sample preparation batch are associated with the following samples, spikes, and duplicates:

SampleNum	ClientSampleName	DataFile	AnalysisDate
B0102082-01A	AP3, SA-2 4.5-6.5		2/15/01 9:00:03AM
B0102082-02A	AP9, SA-2 4.5-6.5		2/15/01 9:00:03AM
B0102082-03A	AP13, SA-2 4.0-6.0		2/15/01 9:00:03AM
B0102082-04A	AP18, SA-2 4.5-6.5		2/15/01 9:00:03AM
B0102082-05A	AP21, SA-2 4.5-6.5		2/15/01 9:00:03AM
B0102082-06A	AP26, SA-2 4.5-6.5		2/15/01 9:00:03AM
B010216001-LCS	LCS		2/15/01 9:00:03AM
B0102082-01A-DUP	DUP		2/15/01 9:00:03AM

Test: Anions by IC (EPA 300.0 M) Prep Date: 2/14/01

Lab Method Blank Id: B010216003-MB

Prep Batch ID: B010216003

Method: Anions by IC (EPA 300.0 M)

This Method blank and sample preparation batch are associated with the following samples, spikes, and duplicates:

SampleNum	ClientSampleName	DataFile	AnalysisDate
B010216003-LCS	LCS	010215_006.DXD	2/15/01 12:01:14PM
B0102082-01A	AP3, SA-2 4.5-6.5	010215_007.DXD	2/15/01 12:17:37PM
B0102082-01A-DUP	DUP	010215_008.DXD	2/15/01 12:33:59PM
B0102082-01A-MS	MS	010215_009.DXD	2/15/01 12:50:21PM
B0102082-02A	AP9, SA-2 4.5-6.5	010215_010.DXD	2/15/01 1:06:45PM
B0102082-03A	AP13, SA-2 4.0-6.0	010215_011.DXD	2/15/01 1:23:05PM
B0102082-04A	AP18, SA-2 4.5-6.5	010215_012.DXD	2/15/01 1:39:27PM
B0102082-05A	AP21, SA-2 4.5-6.5	010215_015.DXD	2/15/01 2:28:36PM
B0102082-06A	AP26, SA-2 4.5-6.5	010215_016.DXD	2/15/01 2:44:58PM

Detailed Analytical Report

Analytica Environmental Laboratories, Inc.

Workorder (SDG): B0102082

Project: FTW230 Family Housing Improve

Client: U.S. Army Corps of Engineers

Client Project Number: none

QC BATCH ASSOCIATIONS - BY METHOD BLANK

Lab Project ID:	2,110	Lab Project Number:	B0102082
Test:	Sulfide, Total (EPA 376.1)	Prep Date: 2/14/01	
Lab Method Blank Id:	B010220008-MB		
Prep Batch ID:	B010220008		
Method:	Sulfide, Total (EPA 376.1)		
This Method blank and sample preparation batch are associated with the following samples, spikes, and duplicates:			
<u>SampleNum</u>	<u>ClientSampleName</u>	<u>DataFile</u>	<u>AnalysisDate</u>
B0102082-01A	AP3, SA-2 4.5-6.5		2/15/01 12:03:49PM
B0102082-02A	AP9, SA-2 4.5-6.5		2/15/01 12:03:49PM
B0102082-03A	AP13, SA-2 4.0-6.0		2/15/01 12:03:49PM
B0102082-04A	AP18, SA-2 4.5-6.5		2/15/01 12:03:49PM
B0102082-05A	AP21, SA-2 4.5-6.5		2/15/01 12:03:49PM
B0102082-06A	AP26, SA-2 4.5-6.5		2/15/01 12:03:49PM
B010220008-LCS	LCS		2/15/01 12:03:49PM
B0102082-01A-DUP	DUP		2/15/01 12:03:49PM
B0102082-01A-MS	MS		2/15/01 12:03:49PM

DATA FLAGS AND DEFINITIONS**Result Field:**

ND = Not Detected at or above the Reporting Limit Shown

NA = Analyte not applicable (see Case Narrative for discussion)

Qualifier Fields:

LOW = Recovery is below Low Control Limit

HIGH = Recovery, RPD, or other parameter is above Upper Control Limit

E = Reported concentration is above the instrument calibration upper range

DIL = Sample required dilution to bring analytes within calibration range of the instrument.

At the dilution level required, the surrogate could not be quantified due to the resulting low surrogate concentration and/or coelution interference from the sample.

Organic Analysis Flags:

B = Analyte was detected in the laboratory method blank

J = Analyte was detected above 2 x MDL but below the Reporting Limit (Quant Limit)

Inorganic Analysis Flags:

B = Analyte was detected above the MDL or IDL but below the Reporting Limit

W = Post digestion spike did not meet criteria

S = Reported value determined by the Method of Standard Additions (MSA)

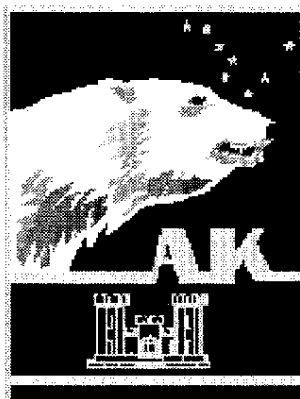
--End of Appendix 4--

**United States Army
Corps of Engineers**

Alaska District
PO Box 898
Anchorage, AK
99506-0898

Final Chemical Data Report

Family Housing Revitalization
Fort Wainwright, Alaska
January 2001



Prepared by
Engineering Services Branch
Materials Section
March , 2001

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Appendix A: Chemist Field Observation Summary

Appendix B: Soil Boring Logs

Appendix C: Analytical Data Tables

Appendix D: Chemical Data Quality Report